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GILB'S MYTHODOLOGY

How to specify maintainability goals for soft system components

MOST experienced computer professionals are now well aware that maintenance of programs and databases is a very important problem.

The simplest measure of this is the current payroll cost of such maintenance, which is frequently 40% to 100% of the programmer's work force.

The degree of maintenance ease for programs and files is, as in the case of machines, not a natural constant which we must tolerate. It is a result of the system design, or perhaps the lack of conscious design effort to make the system easily maintainable.

For this reason, many of us have decided that something must be done to improve the situation. The word has gone out: More maintainable programs! Other soft parts of the system, such as the files, are somewhat forgotten.

Someone shouts, "Structured". Someone else shouts, "Centralise the files: let us go database". Techniques of unknown value are thrown, at great expense, in the direction of ill-defined problems. The result is, of course, unpredictable, except that it is bound to be disappointing.

It is a generally accepted principle of business management and of systems engineering, that we must start off with a clearly defined set of objectives. I believe that this applies to the design engineering of programs and files. We must state the levels and the types of maintainability which we propose to build into our soft system components.

I know, from personal investigation, that to specify a

maintenance goal at all is extremely rare in today's international programming environment. At best the need for improvement is understood by all concerned. The programmers and designers are brainwashed to think in terms of techniques for reaching those vague goals (like structured programming). But they never try to quantify the goal level in advance, or to measure achievement of it afterwards.

What I am going to show in this, and some succeeding columns, will therefore come as a culture shock to most readers. I will not only show that the goal of soft system maintainability can be stated in quantitative terms, but I will also show that the simple concept of maintainability deserves to be "exploded" into about 10 "sub-goals", so that we can get more

realistic control over the design of maintainability.

In subsequent columns, I shall follow up by showing how to specify, and check for adequacy, a design to meet the maintainability levels we have specified. Table 1 shows a second level detailing of maintainability goals.

At the highest level of system goal specification, maintainability is specified on a level with other important system goals such as performance, delivery date, development cost, operational cost, portability, security and reliability, for example.

Many of these goals require a detailed breakdown if we want to ensure that the system designers understand them fully and provide for them in the design specifications. Security is one such goal.

	Worst case	Best case	Planned level
Problem recognition time	24 hours	1 min	60 mins
Administrative delay time	1 week	5 mins	60 mins
Tool and document collection time	1 hour	2 mins	10 mins
Problem analysis time	50 mins	30 secs	5 to 10 mins
Change specification time	1 hour ?	30 secs	5 mins ?
Active correction time	3 x problem analyse time	30 secs ?	3 x problem analyse time
Local correctness test time	1 hour	5 mins	5 mins
Global correctness test time	1 day	?	100 x active correct
Independent change audit time	2 weeks (wait for)	Same hour	Same day, before use
Recovery from original problem time	Same day		2 hours

TABLE 1: A second level detailing of maintainability goals.

"How can I structure the program so that it will be easy for other programmers to read and understand?" But, as we can see from the list of maintainability goal areas, this is only a small part of the overall problem.

In some cases, such as an unexpected minor error, it may not even be desirable to carry out such an analysis at all. It may be more interesting to have "spare part" software available for immediate use, which does not contain exactly that minor fault. System programmers use this method every day at your site.

The breakdown in which I have illustrated here is a close parallel to the breakdown of maintainability goals which will be found in conventional systems engineering textbooks.

The practically oriented reader will notice that this specification intentionally does not give any answers in terms of how to achieve these goals. Indeed, the technical design process may well reveal that some goals are unrealistic, and must be changed to more practical goals. We consciously limit ourselves to asking the right set of questions (or at least a better set than we are currently asking).

This is a language for system architects and system engineers. If you aren't prepared to speak it, then sooner or later your management must find someone who will.

Alarm over implications of errors

It is disturbingly easy to forget — when working on software at a low level — that one's system will ultimately take its place in a dangerous and demanding real world.

This blinkered view, which sees a programming error as an inconvenience rather than a potential cause of disaster, almost certainly stems from the historical predominance of batch processing applications.

While it may be expensive in stationary, a mistake on the in-house payroll is hardly likely to lead to sleepless nights — except perhaps for the analyst and programmer responsible.

Yet with the steady increase in real time and control applications, the potential fatal implications of programming errors are beginning to assume alarming proportions.

PROGRAMMER NOTES

Take, for example, the case of outboard flight control and avionics systems. At the time of writing, divers are still investigating the submerged remains of a prototype Torpedo fighter which crashed in the Irish Sea off Blackpool on budget day.

There has not yet been — and there may never be — any suggestion that the accident was a result of software error.

However, with the very major role now played by digital systems in military aircraft, it might be seen as only a question of time before a catastrophic malfunction is traced to a program error.

And errors in computer-aided design programs have already been blamed for costly and potentially disastrous engineering mistakes.

There was, for example, a case three months ago when five nuclear power stations were shut down in the US because stresses in the cooling system had been subtracted rather than added by the design program (CW, March 29).

All this brings home to one with some force that software quality and reliability assurance are far from being irrelevant and "academic" concerns.

It seems rather that techniques in these fields will assume an even greater significance and will shortly become a vital component of professional software activity.

SOFTWARE FILE

SDL moves to integrate Coral 66 with Mascot

SEVERAL further steps towards the integration of Coral 66 with Mascot have been taken by SDL (Software Development Language) in the release of its microprocessor development system (Context CW, June 7).

Context conforms to the now familiar pattern of hosted microprocessor development systems, using the superior power and facilities of a microcomputer to support the development of microprocessor software.

The host in this case is a Digital Equipment PDP-11, running under RSX-11M, and it is connected to the target microprocessor via a simple teletype link.

SDL sees most users completing initial testing on the PDP-11, where necessary simulating real time devices specific to the micro. Cross-assembled programs can subsequently be loaded down line to the target for final integration and testing.

A significant feature of this scheme is that even when running on the target, programs can continue to access the test files and simulators previously set up on the host. An evolutionary approach can thus be adopted to development, with live peripherals being taken on and checked out one by one.

Further, the programmer continues to enjoy the benefit of

full symbolic debugging, interacting with the micro-resident program via a terminal attached to the host.

Both these facilities, generally referred to by SDL as up line monitoring, are supported by the addition of a small communications module to the Mascot executive on the target.

On the host, the raw data returned by the target's communications module is translated back to the symbolic level via a program load map in conjunction with a stored representation of the Mascot ACP (Activity, Channel, Pool) diagram.

Thus even at the embedded testing stage, the detailed operation of the software can be directly compared with the Mascot application design, as specified in the ACP file.

A further significant Mascot-oriented innovation in Context

is the introduction of compile-time checks on module interaction.

Because Mascot application modules ("activities") can communicate with each other only through "channels" and "pools", the ACP diagram for a process represents all valid interactions between software components.

By checking, then, against the ACP file, Context can detect violations of the application design. These are reported by the Mascot-extended compiler as compile-time errors.

SDL sees such facilities as these as one line of attack on the critical question of software quality control and assurance. The majority of errors, it argues, arise at the system level and can be largely eliminated by a Mascot bridge between system design and implementation.

NCC releases Univac 90 version of Filetab

EMPHASISING its continuing commitment to the Filetab file maintenance and report generator package, the National Computing Centre has released a version for the Univac 90 series.

The new version complements an existing version for the OS/3 operating system. It is level 4 between 8450 and 8510M.

There are believed to be around 2500 users of 40 series machines worldwide and about 100 in the UK. In common with the other Filetab versions, the software will be sold by the NCC in the UK and by agents overseas.

In contrast to its IBM-oriented competitors, such as Mark IV and Easydec, Filetab is available on a number of major mainframes, including ICL, Honeywell and Siemens in addition to IBM and Univac. Applications written in it are therefore, for the most part, fully portable.

Minor modifications are however made between implementations to take advantage of specific operating system features. In the case of the Series 90 implementation, for example, the indexed sequential access method in OS/3 permits one to create an IS file directly from Filetab — a feature unique to this implementation.

Usage of Filetab has been growing rapidly in the last few years, the number of installations having now reached about 900. A good percentage of this base is outside the UK, overseas

sales accounting for almost £1 million of total NCC earnings from the package of £3.5 million.

Prompted no doubt by this achievement, the NCC is understood to be in the later stages of a major review focused on the future development of the product.

However the most obvious line of development — in the form of implementations for minicomputers and small business systems — has already been to some extent pre-empted by the original author of the package, Tom Barnard, whose closely related system RPL is being sold by Filetab Support Services.

NCC experts however see potential development avenues as far from closed and expect to announce significant new products before the end of the year.

Puzzler

GIVEN a rectangular box having internal dimensions of 22 x 10 x 17cm, what packing strategy must be adopted in order to get 295 bricks, each measuring 4 x 3 x 2cm, inside it?

The container has an internal capacity of 7,108 cubic centimetres, so theoretically there is room for 298 bricks with 2 cubic centimetres over. But practical problems restrict the maximum to one less than this. See page 61 for solution.

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Fast coding is aim of SpeedCobol man

By Peter Hewitt

AFTER many years of almost total neglect, serious efforts are now being made by a number of companies to introduce products which really improve the productivity of Cobol programmers, and make the language less laborious to program in, writes Tim Palmer in New York.

Latest contender on the US market is SpeedCobol, from an organisation which calls itself the Foundation for Software Engineering. The Foundation, based in Glendale, New York, is the name under which Dwight Minkler, who developed SpeedCobol, trades.

"I have been developing it for my own use over six years, and rewritten it five times," he told Computer Weekly.

"As it is written in Cobol, it will run on any machine which has Cobol on it. It is currently running on an IBM 370 under DOS, and on four different Honeywell machines: a G115, 2000 and two Level 64 machines, one under G115 emulation and

the other in native Gcos-64 mode."

If all the claims made for SpeedCobol stand up, one of the key attractions is the price: a \$5,000 one-time licence per site with one year warranty, plus an optional \$500 annual maintenance.

Minkler describes SpeedCobol as a Cobol pre-compiler which can be used effectively within one hour of introduction, is self-documenting, and self-referencing, producing its own abbreviation-translation directories, and completely table-driven.

It is designed to cut coding time in half, at the same time improving program quality through the use of more descriptive names.

It takes up about 30K bytes on the 370, and a good table occupies typically another 20 to 25K bytes.

It will be included in the next issue of the Honeywell software directory.

High speed ICL disc management

You know how the map of a disc can show a gradual deterioration of the layout. You may have noticed the machine slowing down in an attempt to access files. You know how long it takes to dump a security copy of disc (mainly because the whole file is dumped, not just the data).

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The outright purchase price of ZAPP is £385 plus VAT per site.

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ZAPP is available for 21 days approval, free of any charge or obligation.

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Please indicate if Cards or Paper Tape are required.

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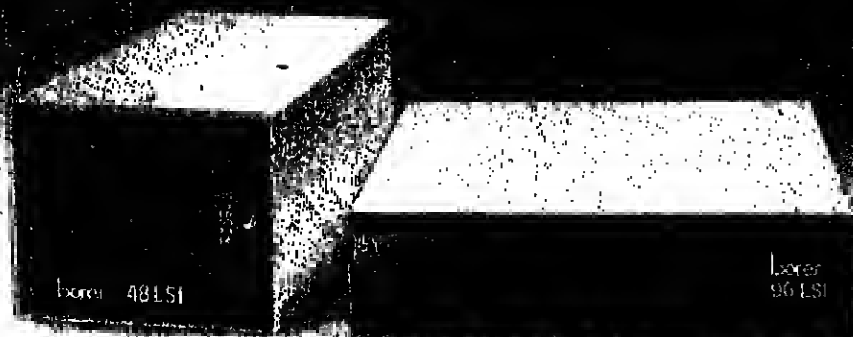
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OP SPOT

The one who made it into management

SITES looking to recruit operations staff could do worse than employ contractors with a view to offering permanent positions to those found to be suitable.

But such installations must be prepared to make it worthwhile for the contractor to take up permanent work, as instanced by the case of New Zealander Alan Morley.

The assistant operations manager of Honeywell's Bracknell, Berks site (stressing the fact that he was speaking as a private individual and not representing Honeywell) gave an account of how contract work led to his current position.

OP SPOT'S Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU. Telephone calls are equally welcome and Bernard can be contacted directly on 01-281 8035.

"My wife and I came over here on a working holiday in 1976, and so I wanted to find some short-term work which was also quite highly paid.

"The idea of contract operating was completely new to me because there was no such thing as a contract market in New Zealand at that time."

He went on a contract at Honeywell in Bracknell during 1979 — "a short-term contract which got longer and longer" — and was eventually offered the position of operations supervisor. "I turned it down because it would have meant a big drop in take-home pay," he said.

After a while, the company revamped the position, changed the job title and offered it to him again.

"It was a big decision because we had planned to return to New Zealand and accepting would mean a change in lifestyle. But the company offered me a really good package deal, so I took it."

"CONTRACT staff can work for the same agency and not meet, so functions like this are very useful," said Alan Morley, assistant operations manager at Honeywell, Bracknell.

He was one of three speakers who addressed a meeting on the subject of contract operating, held at the Piccadilly Hotel in London by operations staff agency Co Operators, a member of the VLI Group.

The meeting, which provided some interesting and lively debate, was chaired by former Computer Weekly editor Malcolm Peltu.

'We're treated as button-pushers'

CONTRACT work provides an outlet for operators who are unable to further their careers despite having considerable skills and experience.

It enables them to earn more and, by moving between sites, they gain a much wider experience of operations than would otherwise be possible.

But in the main, the skills of contractors are wasted because sites employ them as "button-pushers", and shift leaders, in particular, are reluctant to consult them and listen to their views.

These points were raised during an informal question and answer session, when contractors had their say about contract work. Shift leaders came in for a great deal of criticism for failing to make fuller use of the expertise of contract staff.

Several contractors said that

shift leaders resent the presence of contract staff at their installation, and regard it as a threat to their position.

Contractor Nick Berkley commented, "If you suggest an alternative solution to a particular problem, the shift leader often seems to resent it, and so it's best to keep quiet."

"I'm not at all impressed by shift leaders," added another. He later told me that on one contract the shift leader would sleep for the entire night shift, leaving him to get on with the work.

And Martin Leach, an operator with experience on Honeywell OS 2000 and Levels 64 and 88, said, "It's best just to fit in with what they want. If they ask for advice, give it, but otherwise keep quiet."

The fact that applications are run differently from site to site broadens the experience of contract staff, but has the disadvantage of sometimes making their task rather difficult.

In this context Nick Berkley said, "Although you might have experience on the machine and operating system used at the site, you sometimes have diffi-

culty because of the way they run their applications."

Similarly, Martin Leach commented, "This applies not only to operating but JCL writing also. It differs from one site to the next."

Operations documentation would help, but the matter is accorded scant attention at many installations. As one person at the meeting put it: "Documentation? There is no operations documentation."

On the question of why operators turn to contract work, a number expressed dissatisfaction in relation to career progression, including Martin Leach, who said:

"I was a shift leader at 20, but was unable to progress further because of my age. I realised this and turned to contract work."

Asked why he has remained contracting, he replied, "I'm in it for the money — that's the only reason."

Another contractor disagreed with Leach at that point, and said that he would accept the slightly lower-paid contract provided that it were interesting.

Fewer jobs in future, contract staff warned

THE trend towards distributed processing and the "economies of scale" made when larger systems are introduced means that there will be "some recession in the market" for contract staff in this country.

So, as a result of the increased competition which will follow, contract staff must adopt a more "professional" approach if they are to get work.

This warning was given to contract operators at the meeting by Dave Lees, operations manager at Honeywell, Bracknell.

Lees also predicted that once contract work would become available in Europe and that contractors would always be needed for short-term assignments.

On the question of why sites employ contractors, he referred to the conversion process and the need to cover permanent staff who are on holiday or sick leave.

Lees stressed that he was at the meeting as a private individual and not as a representative of his employer, Honeywell.



Lees



Berkley

Where ops' view counts

SEVERAL Australian contractors were at the meeting, including Mike Ryan who is currently working at Honeywell in Bracknell.

He made some interesting points, comparing the role of operations staff in Australia with the part they play in this country.

Said Ryan, "In this country, sites are often content to call in the programmer, rather than allow the operators to look into

and solve problems. "Back home, system programmers and the like listen to the operators and act upon what they say. Over here, they really think that the operators know what they are talking about."

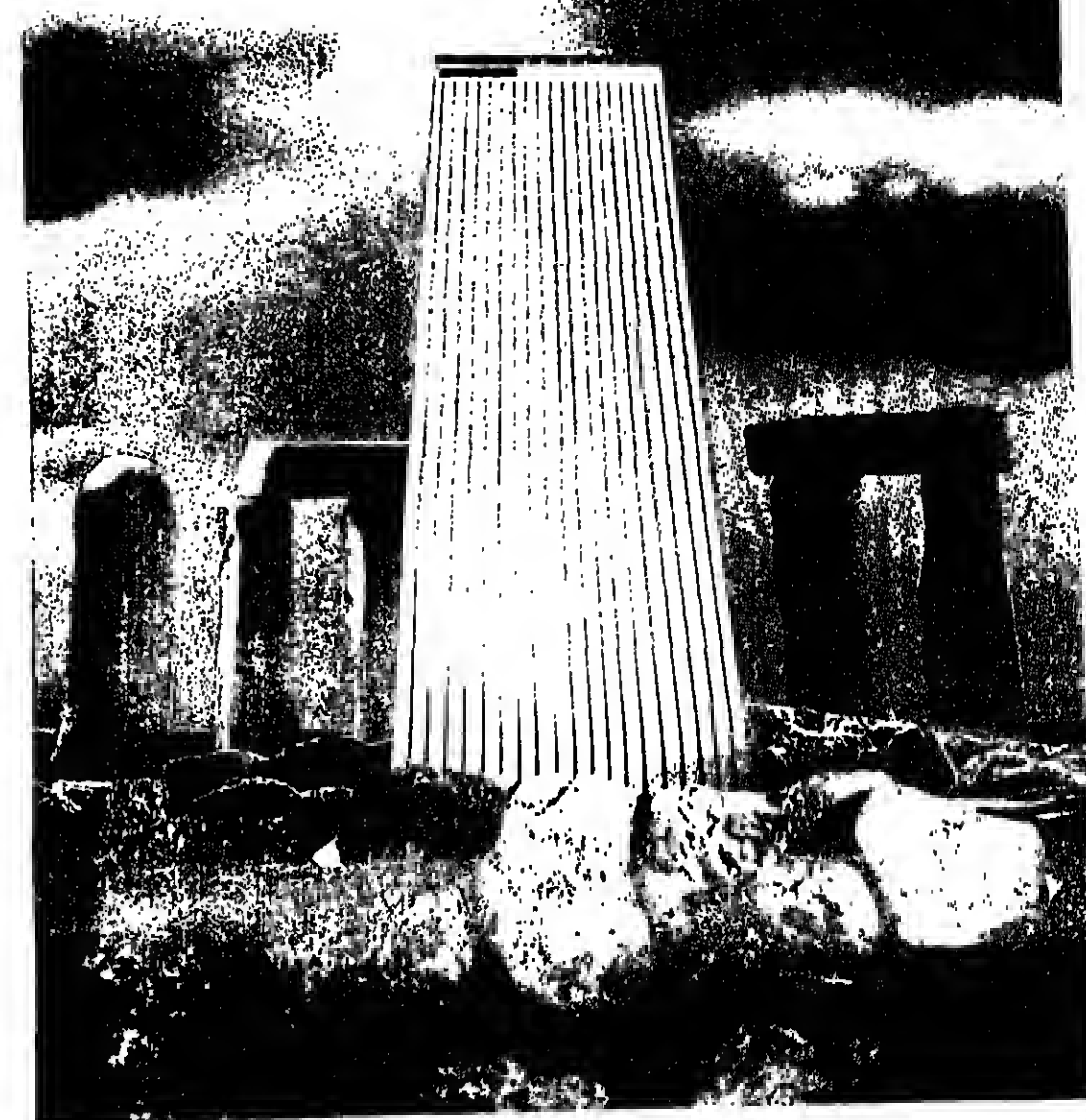
Ryan later told me that he knows several Australians who have held permanent positions both in this country and the homeland, and that their experiences have been similar.

Type of work will change

"It was a completely new ven-

more at the meeting, and the new

THE 3200 ERA HAS ARRIVED



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With all these features and many more, the Model 3220 costs less than many currently available 16-bit systems, a major cost breakthrough. For the first time, this brings within economic reach of a wide range of users the speed, accuracy, power and I/O handling capacity normally associated with 'mainframe' computers.

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The 3200 Team

Perkin-Elmer, a Fortune 500 company, is world-renowned as a major manufacturer of high-technology optical, instrumentation and data processing products. The Model 3220 SUPERMINI is the latest evolution in the company's commitment to industry leadership and innovation. It is backed by years of field experience, fully-proven software and a team of dedicated professionals committed to making your installation a success.

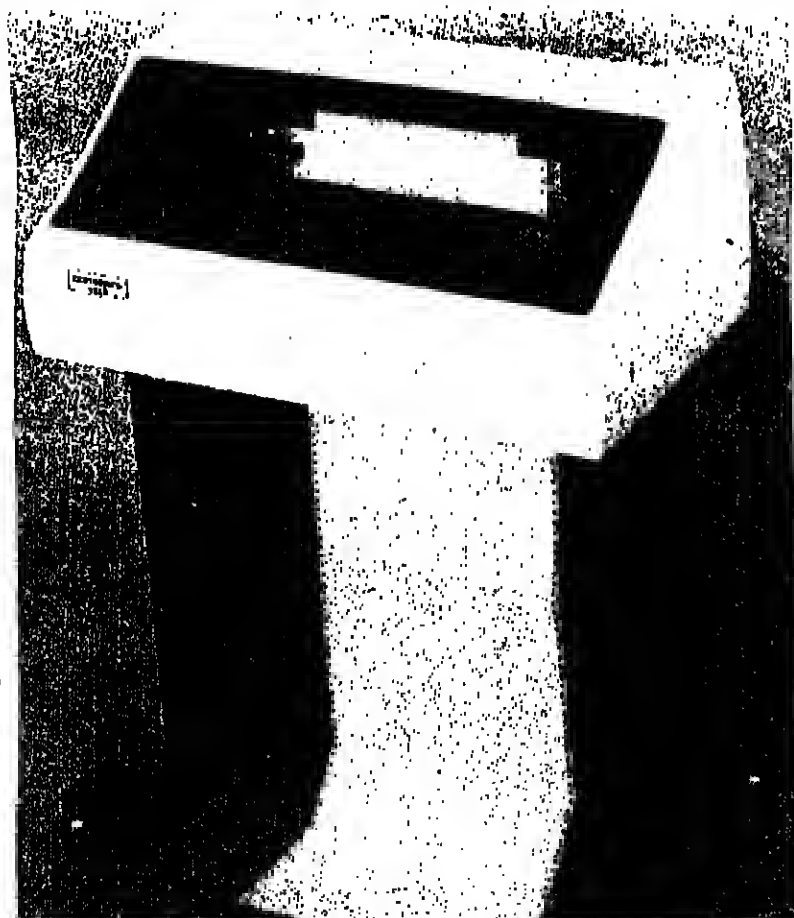
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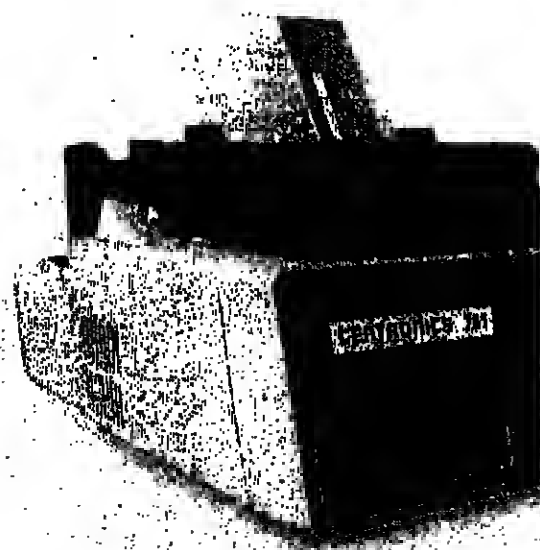
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| ■ Model 761 RO | £1371 |

For further information contact Mr Len Watts at the address below:



PEOPLE AND EVENTS



Young Engineer for Britain 1979 contest

MORE than 300 young inventors are competing in Young Engineer for Britain 1979, a competition organised by the Department of Industry as part of its strategy to encourage young people to consider a career in industry.

Projects are classed as either mechanical, electronic or chemical and should have commercial potential, benefit industrial production, cut waste, make better use of energy resources or improve an existing process. Last year's winners in-

cluded a microprocessor system, an invalid car and a vertical axis windmill.

Many awards have been offered by industry to national and regional winners, including scholarships, overseas and industrial visits and cash prizes. STC will present £500 to the best girl in each class.

The final will take place at the Wembley Conference Centre on October 24-25, and Prince Charles has been invited to present the title award.

Directors for Racal, Plessey and MDS

THE position of commercial director has been created at Racal Automation and is filled by Derek Henderson. He will be responsible for marketing, sales and service, and will be based at Ruislip. His previous position was area general manager for Racal Tacticon in Saudi Arabia. He has formerly worked for Racal as chief engineer in charge of receiving systems with Racal Communications, and this was followed by a five-year spell at Marconi Space and Defence Systems.

Another newly-created position, that of director of technology and strategic planning (components) with Plessey, will be taken by Dr Roger Gascoyne, formerly systems manager of Commercial Union Assurance Company, has now been appointed management services manager of Merchant Investors Assurance. He will be responsible for all data processing and O&M activities within Merchant Investors.

John Eladen has become the youngest ever member of the board of Allied Business Systems, at the age of 27. He joined ABS seven years ago and his last appointment with the firm was as a technical manager.

Melvyn Larkin on July 1. Larkin, formerly chairman of Motorola and director of its semiconductor division, will be based in Swindon. He has held senior technical management positions with Mullard, Warrington and Texas Instruments, and his speciality has been semiconductor research.

MDS Data Processing, the UK subsidiary of Mohawk Data Sciences Corp, has appointed Tom Duddy as director of marketing. He joins the company from Data 100, where he was London regional sales manager, and has held sales positions with SPT and NatWest's Centreline.

Neil Osborn has been appointed to the position of systems and administration manager with Antocks Ltd. He was formerly a freelance consultant working on the development of application programs, and is a member of the IDPM. His position is a new one.

Norman Shiff has become a sales executive with Zygal Dynamics. Former appointments were as design engineer with Data Dynamics, and working on telex and viewdata with OEC.

By Judith Morris



Mike Briarcliffe has joined Systime as marketing manager for automotive and distribution products. He previously worked for Appleford of Harrogate as parts manager, and eventually was responsible for implementation and running of the first Systime system to be used by British Leyland.

Richard Bale becomes business development manager of Tynshare UK, a newly-created position. He is replaced as West London branch manager by Bob Lewis.

David Spier has been made IIC sales manager with the commercial systems division of Computer Automation. He is replaced as Southern region sales manager by John Milway, formerly an area sales manager. Mike Marthall becomes Northern region sales manager, having previously held sales management positions with Olivetti, Univac and MCS.

John Purr, formerly a service engineer with Technicom, has joined Euro Electronic Instruments as a sales engineer.

Dove Robinson at National Semiconductor in Greenwich has been promoted from production manager for CMOS products to product line manager for high voltage manufacturing.

John Phelan, previously a programmer with Quantum Software, has joined Bullitt Computers as a systems analyst for the Northern branch. Maurice Foster, who has been a management consultant for 17 years, has become credit manager with Rediffon, and Robin Mide has left Barracraft, where he was a financial manager, to become financial manager at Ruffin's Scottish branch.

Brian Tobias becomes UK sales manager of AVX and Alkermat, having been UK account manager.

Lawrence McNulty, formerly Kinzie's Manchester branch manager, has been appointed applications specialist, London with the company.

Charles Spotswood has been appointed by Atlantic Computer Leasing as South West area sales manager, and will report directly to the UK sales director. He was formerly sales manager of the civil division of BOC Datacube.

DIARY

JUNE 27 Introduction to database, North-East London Polytechnic, Barking. Details 01-599 5141 ext 49, 01-599 5999.

JUNE 28 Interactive project management, seminar, Dr James H. Gordon, Aldin, On-Line, Midland Hotel, Manchester. Details David Lloyd, 0225 34118.

JULY 2-6 CAD and manufacture of electronic components, circuits and systems, conference, IEE, ECS and others, University of Sussex, Brighton.

JULY 4 Legal information, problems and solutions, ECS Information Retrieval and Law Group, City University, London EC1 1AA.

Relational databases, North-East London Polytechnic, Barking. Details 01-599 5141 ext 49, 01-599 5999.

JULY 6-11 Consumer electronics, symposium, Society of Electronic and Audio Technicians, University of Essex, Colchester.

JULY 16-18 Operational data security, workshop, Operational Data Security Centre, Hotel Zurich, Zurich, Switzerland.

AN award has been made to ICL for the best Annual Report to Employees. It is the George Walker Trophy, awarded annually by the British Association of Industrial Editors.

The 53 entries were judged by Michael Lafferty of the Financial Times, whose comments on the winner included "Less patronising than any other report... does not shy away from profit... devotes a page to shareholders, a page to parables... scores well in all its ranking areas."

Lafferty also praised the design of ICL's report, which was carried out by John Townsley Design Associates.

Our picture shows Ben Louth, editor of ICL's report, with the George Walker Trophy.

Thames Pay, previously Mobil general manager of public relations in New York, has been made vice-president of communications with TRW and also takes responsibility for TRW's European corporate office in London.

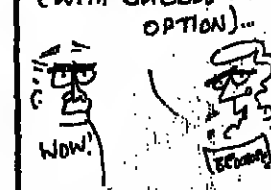
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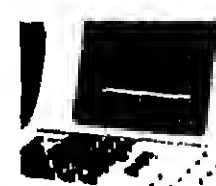
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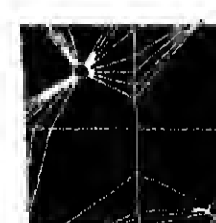


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This unique course is specifically designed for engineers and senior technicians involved in production testing, field service, and design of microprocessor-based systems. The course provides these personnel with the practical knowledge they require, including an in-depth understanding of: a) microprocessor software and hardware; b) how to apply the most powerful microprocessor debugging techniques; and c) how to use microprocessor troubleshooting equipment. The course also provides concrete recommendations for the design of testable microprocessor systems.

LONDON
September 24-28

Distributed Processing & Computer Networks

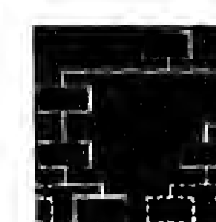


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This course provides a comprehensive introduction to distributed processing and computer network system design techniques. It covers the individual elements of a distributed processing system and how these elements are synthesized to form a system which best meets the application specific objectives. Participants will learn how to analyze their own requirements, and how to select hardware/software systems which will meet those requirements. The course will be particularly valuable to those involved in the selection and management of distributed processing systems.

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Versatile memory system

A NEW expansion memory system based around a new and flexible bus structure has been introduced by Intel. Known as the Series 90, the company claims that it can cope with a wide range of potential memory expansion requirements, as well as new memory technologies as they emerge.

The new bus structure, designated the BXP bus, has been designed specifically for use in memory systems. It contains 24 address lines, four module address lines and a bus select function. The address lines allow addressing up to 16 Megawords for each memory module, of which there can be up to 16. The bus select function allows expansion to more than one BXP-based system.

Word sizes ranging from 22 bits to 88 bits, without error correction, and 20 to 80 bits with error correction, can be accommodated by the bus.

Tandy revamps TRS-80 for small business market

IN a move away from the home computer market, Tandy is to launch a completely revamped version of its TRS-80 microcomputer system aimed specifically at the small business market.

Production of the new system, to be called the TRS-80 Model II, is scheduled to start in July, though it is unlikely to be available in the UK before February, 1980.

The revamped hardware for the Model II is considerably reworked from the original system, which was aimed at a home market that, even in the US, is now

being doubted as a long term area of survival.

The major changes include the provision of an integral video display, rather than a separate monitor of the Model I. This will provide 80 characters per line in both upper and lower cases.

It also features a 6-inch floppy disc drive, with up to three being possible, offering around 2M bytes of disc storage capacity. An optional bi-directional printer is also scheduled to be available for the new system.

The minimum internal memory is 32K bytes, expandable up to 64K bytes, and the majority of software for the system will use Tandy's Level 3 extended Basic. This runs in 24K bytes of the system's memory. The company expects to offer a range of general-purpose programs for the system.

Pricing of the hardware, though still to be finalised for the UK introduction next year, already looks competitive. Tandy in this country expects to be selling just one version of the Model II, equipped with

64K bytes of memory and three floppy disc drives with an anticipated price between £4,500 and £5,500.

Marketing in the UK will not be through Tandy's existing network of audio equipment stores. The company is planning to open eight specialist outlets around the country, dedicated to selling and supporting both Model I and Model II of the TRS-80 range. Though none has been sited as yet, Tandy expects to have stores in most major cities, including London, Manchester, Leeds, Birmingham and Bristol.

September launch

TEN or 20M byte Cromemco microcomputer systems should be available in this country in September. Current, the company's UK distributor, is currently evaluating a disc-based system that uses Winchester technology discs. Though pricing is not yet available, Cromemco expects a 54K byte system with 10M bytes of disc storage to cost about £8,500.

Will a £100 gamble find the perfect program?

AN idea that could lead to a software vetting service for personal computer systems is to be tried on British programmers by Jerry Thompson, managing director of Shade Computer Services. And he is willing to

back the idea with £100 of his own money.

Thompson claims that the majority of software currently available for personal computer systems such as the Pet, Apple II and so on is not satisfactory.

He is offering the money as a prize to the writer of the first personal computer application program that he fails to crash within a week. He feels that it should be interesting to see whether programmers have enough faith in their products to take the gamble.

For the programs that are crashed, Thompson is willing to provide a short written report on why and where it happened, for a fee of £10. A more detailed report, giving methods of rectifying the faults in the programs, will also be available. But for this, Thompson will charge standard consultancy rates.

"I will be delighted if I have to pay out the £100," Thompson said last week at Shade's Caine, Wiltshire offices. "But there is a lot wrong with many current packaged programs, and their marketing."

"A £25 payroll program running on a £800 microcomputer is not the same as a £1,000 program running on a £8,000 machine. You don't buy a Mini and expect the appointments and performance of a Ferrari," he said. "However, much of the sales and marketing seems to indicate that this is so, and the customers get caught out."

Referring to Wiltshire's close association with meat, he said, "You don't buy bad meat from the same butcher twice." A succinct expression of his views on

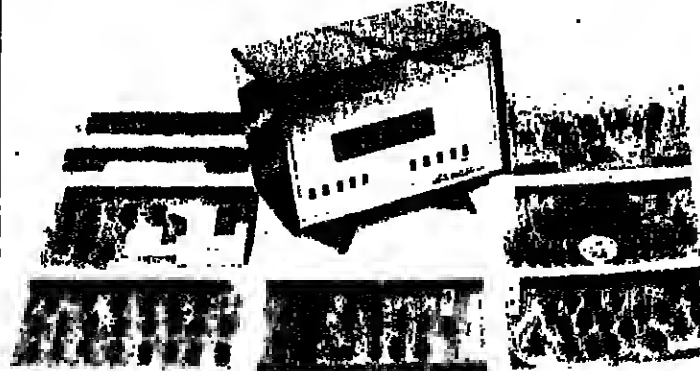
current software.

His ground rules for "entry" into the test are that it must be a British-written microcomputer package, preferably capable of running either on the Commodore Pet or under the CP/M operating system. It must be available for the general market, for use by the general public (rather than a computer "specialist") and be intended for commercial and business environments. The program must also be well documented.

A full copy of the rules can be obtained by sending a stamped addressed envelope to Shade, at 1 Pinfield Street, Caine, Wiltshire SN11 0EF.

Among the immediate modes of failure in the test will be when any inputs or outputs on the program do not match the documentation, and where incorrect keying brings about such statements as "Syntax Error" without a recovery routine.

Thompson hopes that his challenge will lead to the establishment of some form of permanent software vetting service, so that the general standard of programs available for microcomputer systems can be raised. He is himself aware that, no matter how good a programmer an individual thinks he is, some one else can nearly always find bugs in his program.



The Radiocode clock.

Radiocode clock offers atomic accuracy standards

A NOVEL method of maintaining a constant time reference for computer systems, that does not suffer the vagaries of system downtime or power failure, has been developed by Circuit Services in Ruislip.

It brings to computing the accuracy associated with atomic time standards, and requires no intervention from computer room staff to operate.

Circuit Services' development, called the Radiocode clock, is a fully self-contained electronic clock, referenced directly to a Caesium atomic clock in Rugby. The referencing is achieved by radio on a high-power 60kHz transmission from Rugby that can be received anywhere in the UK.

This clock itself has been available for some time, and is used in such establishments as the National Physical Laboratory. The company has, however, now produced a serial Aclit interface suitable for direct connection to a computer system. This interface takes the 24-bit parallel BCD output of the clock and converts it to RS232C compatible Aclit, with switchable baud rates between 75 and 1,200 baud.

As the clock is continually referenced by radio to the atomic clock, and has an internal crystal for running without receiving the Rugby signal, no intervention by computer room staff is needed.

PO software rewritten by CDC enhances its Insac for viewdata in US

THE viewdata system sold by Insac to GTE in the US (CW, June 14), is significantly different from the Post Office Prestel system on which it is based, and underlines the capability of Insac as an independent operator.

The Post Office software has been entirely rewritten by Insac to run on the Digital Equipment PDP-11 minicomputer, with appropriate billing and communications adaptations for the US market. The US software was designed by Insac itself, and coded by Insac member SDL. The US system will operate with a full alphanumeric keyboard from the start, whereas the current version of Prestel is designed for numeric keypad, with alpha keyboard a subsequent optional enhancement.

Since CCITT has adopted the term Videotex as the generic name for Prestel-type systems, GTE has adopted Viewdata as the name for its service. Two US market trials are planned: a business service this summer, and a subsequent domestic trial. The Insac Viewdata system is fully compatible with terminals used on Prestel, but GTE will initially offer terminals from Intelligent Systems Corp.

GTE is regarded as a particularly attractive partner on viewdata because it has several relevant interests. It is the second largest telephone company in the US after AT&T (although the service will of course be US wide, not confined to areas where GTE is the telephone operator). It manufactures TV sets in its Sylvania subsidiary, an electronic equipment manufacturer, and also operates several database services.

Conditions put by the US Federal Communications Commission on GTE's proposed \$55 million acquisition of pocket-switched network operator

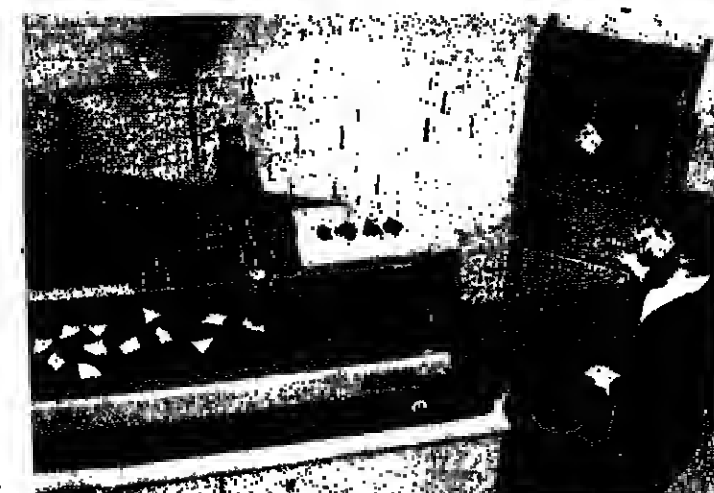
Telenet might have jeopardised that deal, but last week, the FCC relaxed its conditions at GTE's request, and the acquisition has now been completed. Telenet, although not essential to GTE's offering of a viewdata service, will be an appropriate medium on which to carry the service.

The agreement covers viewdata service in both the US and Canada, and GTE plans to offer the service to users on a local call basis.

What is not clear is the nature of the service to be offered. A spokesman for GTE talked in terms of an information service similar to Prestel, with organisations like newspapers, information services and publishers signing up as information providers. However other people close to the discussions indicate that the business service might be more oriented towards the Closed User Group concept, where a company uses viewdata as a means to distribute information to branch offices and so forth; applications like credit authorisation are also being considered. For the residential market, ideas which have been considered include using viewdata to pay bills and carry out banking transactions, perhaps with terminals installed commonly in apartment blocks rather than in the home. An obvious domestic application is working out personal taxation.

The use of a packet-switched service such as Telenet or Tymnet to carry viewdata will make charges distant-independent, providing a framework for a national service.

Marketing of viewdata will be handled jointly by GTE and Insac Viewdata Inc, yet another US Insac company. The latter will be offering in-house viewdata systems for companies which will be similar to the private systems offered by com-



In this demonstration of the optoelectronic robot sensor, a TV camera linked to a microprocessor sees and identifies stamped metal components on a moving conveyor.

Sensor enables robots to recognise objects by shape

NEW applications for microprocessor-controlled robots in factories are envisaged by Brown Boveri following the perfection of an optoelectronic sensor, which the company will start manufacturing in volume within a few months. The sensor enables robots to "recognise" objects by their shape.

A prototype sensor has been used in a robot at the Volkswagen factory in Wolfsburg, West Germany, since last autumn. This machine distinguishes between right and left hand studs for axle suspension, and puts them in the right position for an automatic welding machine.

This system was developed to allow components on a moving conveyor belt. A TV camera

mounted above the conveyor is linked to a microprocessor which controls a movable grip arm. As objects move along the conveyor, they are detected by the camera, which transmits an image to the micro.

This image is broken down into 100,000 points, each of which can be either light (indicating the presence of an object) or dark. By noting the co-ordinates where light points are adjacent to dark points, the outline of the object can be determined.

The outline is then compared with a set of pre-recorded outlines stored in a read-only memory. When a match is made, the microprocessor instructs the robot to perform the action necessary for that component.

CDC enhances its European services

CONTROL DATA over the past few months has invested a considerable sum in improving its European data services operation. The major changes are the installation of five new computer systems and the Network Operating System, and the provision of more powerful connecting links with the rest of its worldwide network.

The new computers include

the IBM 3031 just installed at the company's Barnet centre (CW, May 3), Cyber 175s in Brussels and Stockholm, and two of the IBM-compatible Omega 460s in Brussels. They bring the total of computers in the network up to 37.

In addition to providing more capacity for European users, the new systems will also enable Control Data to provide more user software. A number of packages are currently available only to US customers, and some of them will be modified and released in Europe over the next year.

Connection between the European centres in London, Brussels and Stockholm has been enhanced by the provision of an automatic switchover facility.

Other European centres are to be linked into the network in the same way. The data centre at Rijswijk, Holland, is scheduled for connection before the end of the year, while the centres in Paris and Frankfurt will complete the enhancement during 1980.

Microforum Europe 79 opens at Wembley

BILLED as the most important microfilm event to be held outside the US, next week's Microforum Europe 79 at the Wembley Conference Centre, London, should have something to interest most computer users with a paper storage and retrieval problem. The show runs from June 28 to 29.

Only a handful of organisations offering computer output microfilm bureau services will be appearing at the show, but most of the COM recorder manufacturers will be there to talk to computer users who are thinking of investing in their own COM unit. There will also be a wide

range of other hardware designed for COM users — like readers, reader printers and automated retrieval systems.

Euromat Data, the biggest COM bureau in Europe, has taken a stand at Microforum to talk about its 24 hour turnaround service for converting magnetic tape to microfilm or film, including its 72X reduction ratio service which squeezes 880 pages on to a single microfiche.

Datagraphix, the firm that specialises in COM recording equipment, will demonstrate its low-cost Autocom recorder in its online and stand-alone versions as well as the powerful Model 4880 COM configuration which comes with its own tape drive, card reader and line printer.

Datagraphix competitor, NCR, will demonstrate its 843-101 system which can deliver individual processed microfiche in one operation, while three other COM equipment suppliers, Kodak, Bell and Howell and Agfa-Gevaert, will exhibit readers, retrieval systems and duplicators.

On each of the first three days of the show there will be a one-day seminar covering the basics of microfilm, including COM. It costs £48.60.



THE FINANCIAL SOFTWARE COMPANY

Q. Who is MSA (Management Science America) Limited?

A. We are part of MSA Inc., a worldwide computer software company developing and supporting financial applications.

Q. What do we do?

A. MSA provides a complete range of application systems covering cash management, financial management and personnel management to more than 3500 companies around the world.

Q. How can MSA help you?

A. Whether you need to develop an entirely new system or whether your existing systems have reached the saturation point and must be re-written, using a proven generalised software package will help you overcome the problems of:

Limited resources in your data processing departments. This will enable you to deliver the new systems without the need for additional people.

Changing priorities in your business environment. You will be able

to deliver the systems you require without delay.

The communication gap between users and data processing. You can deliver the systems complete with all the necessary documentation and training.

Rising costs of data processing and systems development. You can deliver the systems for a known investment.

Q. What will this mean to you?

A. The use of a proven generalised software package will permit immediate implementation.

Q. What are the MSA application systems?

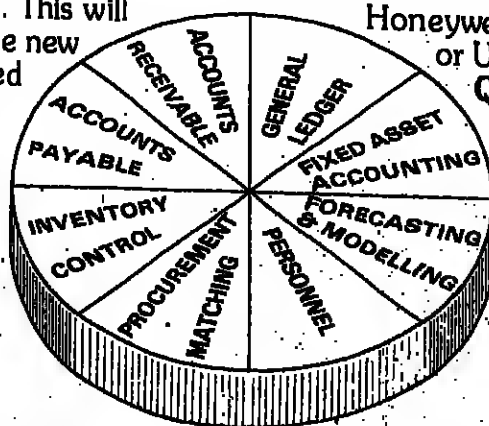
A. (see diagram).

Q. Who can use MSA?

A. Anyone in manufacturing, banking, insurance, building societies, distribution, transportation and Government utilising IBM, ICL, Honeywell, Burroughs, NCR or Univac hardware.

Q. How do you find out more?

A. Telephone Sue Spicer on Slough (0753) 70751.



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MEMOREX

12-nation speed-up on standards likely

STANDARDISATION of computing at an international level should be speeded up following an agreement on co-operation between the heads of 12 different national computing centres.

The directors, who met in Oslo, agreed to exchange information on the subject regularly to encourage a common approach, and to support national standardisation activities, particularly in the fields of programming languages, networks, and quality assurance for software.

David Fernberg, director of the NCC in the UK, was at the

meeting, together with heads of corresponding organisations in such countries as France, West Germany, Japan, Spain and Italy.

The US was not represented, but two Communist countries, Hungary and Czechoslovakia, were.

An agreement on exchange of information and co-operation was also reached covering the area of the social impact of information technology. Each centre will appoint a "contact man" to look after information covering research projects and reports.

The NCC in the UK is to carry out a survey of the use of computers in education in the various countries, particularly in secondary schools. This is to help the national centres promote such computing.

The directors also agreed to exchange information on user needs with regard to electronic office systems, on national research and development programmes, on the applications of micro, and on systems analysis.

The next meeting is to be held in Japan in October 1980, just before the IFIP World Conference.

Recruitment firm sets up computer consultancy

A COMPUTER consultancy division has been added to the executive recruitment company, Peter Counsel.

The new company offers a variety of services ranging from guidance on equipment selection

to a complete "turnkey" operation where required. The services are aimed at small and medium-sized businesses.

The consultancy operation will be headed by Derek Lightfoot, who is a former consultant

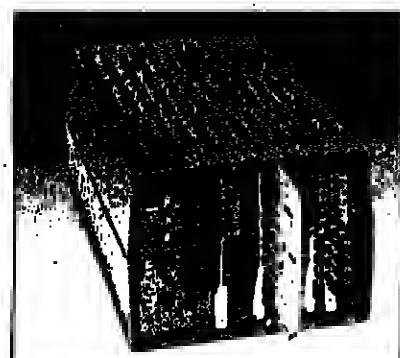
with Scicon and was until recently management services manager with Roneo Vickers. The company hopes to maintain its independence from any hardware or software in order to offer an objective approach.

Three men? Yes—but three men representing the experience, expertise, resources and technical back-up services which have made Racal-Milgo the biggest name in data communications in Europe. And it's these three men who have been particularly chosen because of the vital roles they have in introducing our new 26 LSI modem.

The 26 LSI is the result of extensive research into the present and future needs of you—the data communications user. We've developed it: it's in production. Now it's their job to see that it gets into your hands quickly and begins to earn its keep.

Take the chap on the right—he's one of our applications engineers. Ring him up and he'll talk all day about its operational flexibility.

In the middle is our international network specialist. There isn't much he doesn't know about configuring multi-national networks—and he's only too ready to help you.



Look what's behind the world's most capable 2400 bit/s Modem

What's he holding? That's the 26 LSI. LSI because that's the technology which, with modular construction, makes it so compact (only half standard rack width) and gives outstanding performance and reliability—economically.

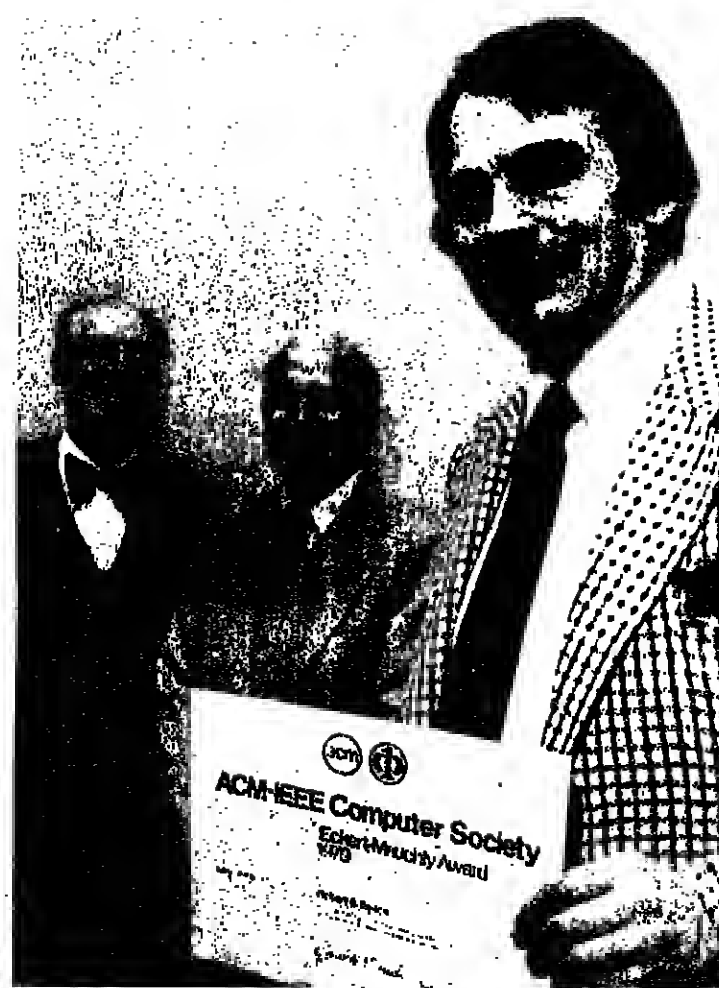
2400/1200 bit/s operation over voice-grade telephone lines; fully compliant with CCITT Recommendations V.22 and V.26 bis; simple to use; easy to service.

And optional plug-in cards gives the operational flexibility which provides for example, remote test facilities, full-up operation and a completely independent 150 bit/s secondary channel.

Oh! (We nearly forgot) That's our production manager on the left. He'll ensure delivery on time! That's what's behind the 26 LSI.

Racal-Milgo Limited, Portman House, 12 Portman Road, Reading RG3 1NW, England. Tel: Reading (0734) 594811/6 Telex 848847

ACM award goes to Burroughs director



DIRECTOR of Systems Organisation Research at Burroughs, Robert Barton has become the first recipient of the Eckert-Mauchly Computer Architect Award presented jointly by the Association for Computing Machinery and the IEEE Computer Society.

Barton has been with Burroughs for 25 years, and led the team that designed the B5000, the firm's first large machine and a trailblazer in the techniques of multiprogramming.

The award, which will be presented annually in recognition of achievement in the field of computer design, is named in honour of Presper Eckert and John Mauchly who designed and built Eniac and Univac I, the first American computers. They were in Philadelphia to present Barton with his certificate. It was nearby at the University of Pennsylvania in 1949 that Eniac first started life.

In his citation Barton was described as having made computer systems "simpler to understand, simpler to engineer and construct, and easier to use, for everyone's benefit."

Robert B. Barton (foreground), director of Systems Organisation Research at Burroughs, receives the Eckert-Mauchly Computer Architect Award from Drs John W. Mauchly (left) and J. Presper Eckert who in 1949 co-invented the first American computers.

ICL makes debut at word processing show with the 7700

A NEWCOMER to the International Word Processing Exhibition this year will be ICL, which is demonstrating its new 7700 Information Processing System, combining WP and DP. By a link to a miniframe in Reading the firm intends to show an electronic mail facility working with the two 7700s on the stand.

The exhibition will be at Wembley Conference Centre from July 10 to 13, and among the 42 exhibitors will be most of the word processor manufacturers in Europe.

At the same time a series of half-day seminars is being run by Online on various technical and applications aspects of the hardware, together with two whole-day conferences, one on "The people factor" and the other a look to the future, "The electronic office."

Topics covered by the seminars include an introduction for the first-time user, advice on selecting equipment, a review of the latest equipment, and WP supervision. Applications areas covered are three: the professions, the public sector and the financial sector.

To register for the exhibition, contact BETA at 109 Kingsway, London WC2B 6PU, and for the seminars, Online at Cleveland Road, Uxbridge UB8 2UD.

Mostek memory boards could extend PDP-8 life

A NEW range of add-in memory boards has been introduced by Mostek that could greatly extend the working life of the faithful Digital Equipment PDP-8 computer.

Known as the MK 8000 family, it consists of five boards, offering 16K, 32K, 48K, 64K and 128K words of 12 bits each. As yet, UK pricing is not settled.

The family adds to the growing range of general purpose memory boards produced by Mostek, each of which makes use of the company's 200 nanosecond, 16K bit dynamic random access memory components.

There is some speculation that Mostek is considering using some of these general purpose boards to produce a replacement fixed head disc memory system, similar to that planned by Intel (CW, April 12).

A spokesman for Mostek said this week that the company is studying the fixed head disc marketplace, among others, but that no positive moves are planned at present.

● Mostek last week realised nearly \$17.5 million from the sale of 750,000 shares on the US stock market. It seems likely that the money will be invested in the company's new NMOS wafer fabrication facility, being built in Colorado.

Part-time degree course

A PART-TIME degree course in computer studies is to be introduced in September by Sheffield Polytechnic. A mixture of evening-only or daytime classes is available, with a programme of study normally lasting five years.

The course is intended for those already working in the computer industry. People with certain qualifications or experience may be exempted from up to two years of the five.

Danish president

AMDAHL European users have elected Ejner Dinesen of the Copenhagen bureau, I/S Datacentralen, as their president. The election took place in Copenhagen at the first meeting of the users group which was attended by 60 delegates. Speakers included AMDAHL chairman Dr Gene AMDAHL and John Lovin, president of the AMDAHL users group in the US.

NEW TERMINALS FROM DIGITAL EQUIPMENT

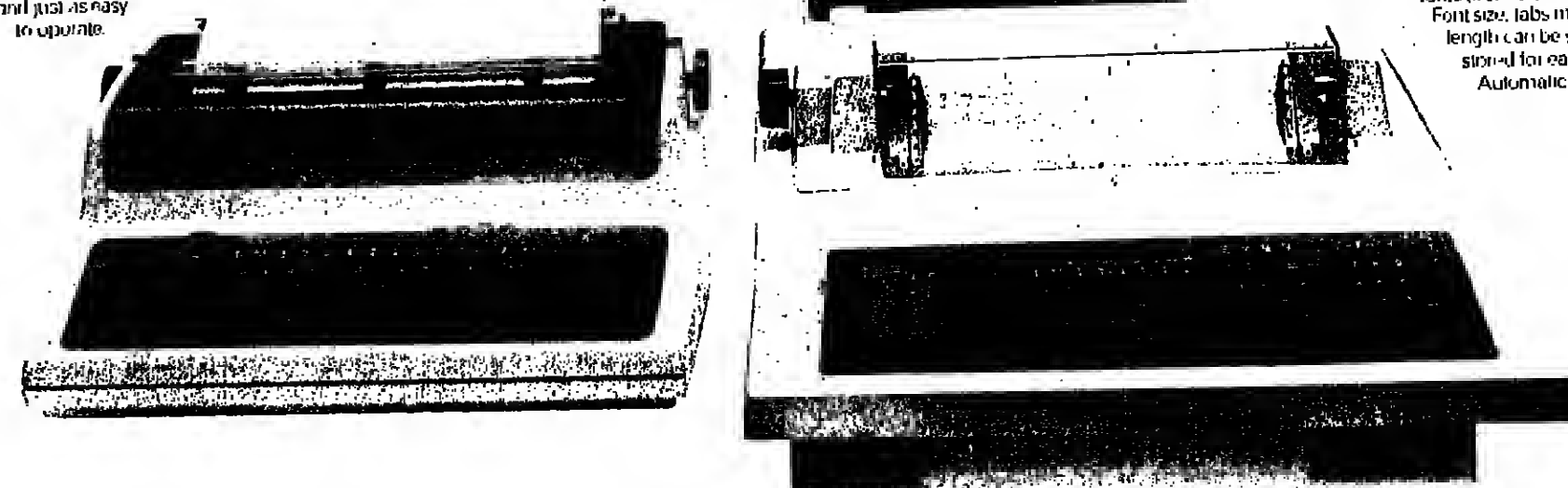
In technical terms, they look very good...

VT100/132. New video terminals. Up to 132-column width. Line-drawing capabilities. Up to 9800 baud rate. Exclusive "Slow Scroll" read ability. Self-test diagnostics. Most functions set from detachable (up to 2 m) keyboard. VT132 adds adding capabilities.

PDT-11 Intelligent terminals. PDP-11 technology. Can be programmed, clustered, equipped with mass storage and used in synchronous or asynchronous networks. Shown is PDT-11/150 with floppy disk drive, intelligence and memory. Use with any keyboard terminal. Not shown: PDT-11/130 (with memory and tape storage), PDT-11/110 (intelligent terminal with memory), both incorporating VT-100 VTR/keyboard features.

LA34. Tabletop DE Writer. 300 baud. 30 cps. Choice of 4 compressed fonts (10 to inch up to 16.5). Cartridge ribbon. Roll feed. Numeric pad option. Smaller and lighter than most standard typewriters and just as easy to update.

LA120. High-performance terminal. Print speed 180 cps, baud rate selectable from 50 to 9,600 baud. (More than 45 user-selectable features relating to printing and formatting). Choice of eight compressed fonts (from 6.5 to 16.5 to inch). Font size, tabs margin and form length can be set at keyboard. Signed for easy recall. Automatic self-test.



In human terms, they feel even better.

Suddenly, the broadest range of terminals in the industry has got even bigger.

Major introductions. New video terminals. New hard-copyers. A totally new family of programmable terminals (PDT-11).

Terminals you can quickly combine into a common communications network, because their control codes are all part of one carefully thought out intercompatible standard.

All offer a wide range of communications interface options. Customer-assignable function keys. High commonality of parts, right down to standard IEC 435 line cord. All have switching regulators, for quieter, cooler operation. And for neater, more compact styling—

Human engineering specialists have colour-toned

each terminal to blend compatibly with the modern office environment. Keyboards are standard typewriter layout, with keys finger-sculpted and position-identified to maximise acceptability by any keyboard operator. Operator status lights are standard.

Still, these new terminals only represent a part of the total terminal family we have to offer. And if you haven't yet found out the advantages of dealing with the industry's only true "one-stop" terminal supplier, perhaps now is a very good time to find out.

We'll be very glad to send you data on all or any of these new terminals. And if you want to know more about existing terminals, like the well-known LA-180 line printer for example, just tick the "basket" box, too.

Digital, I'd like your Components Group to send me data on:
New video terminals ☐ New hard-copy terminals ☐
New PDT-programmable terminals ☐ I don't know your full range... send me a complete basketful ☐

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Address _____ Telephone _____

Send to: Components Group, Digital Equipment Co. Limited, Digital House, Kings Road, Reading, Berks, RG1 4HA



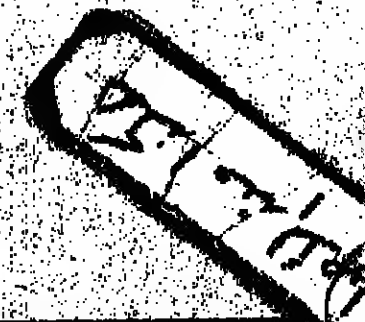
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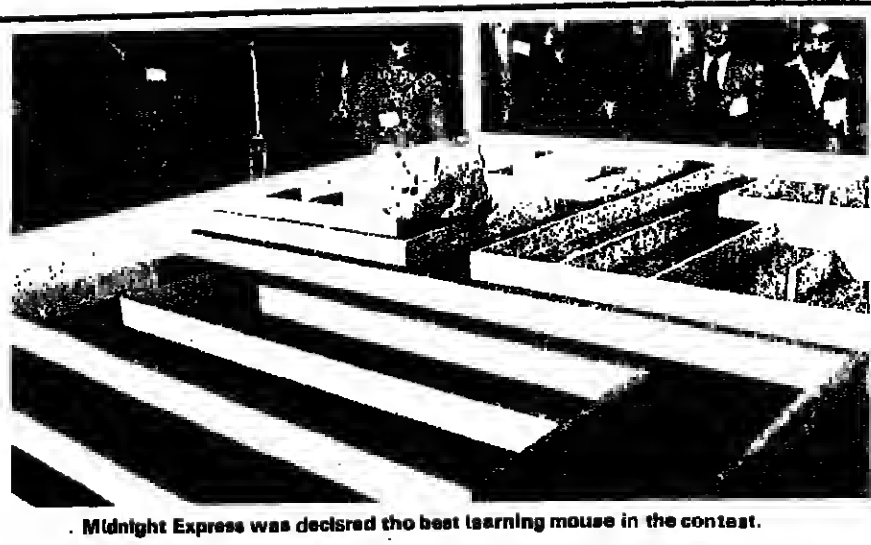
Of mice and men— and machines as well

THE Moonlight special from the Battelle Memorial Institute swept the maze board in the great Micro Mouse contest, which was one of the main attractions for visitors to the National Computing Conference in New York. It also proved to be a major event for many of the TV and newspaper journalists covering the show.

The contest started at last year's NCC and has been running throughout the year at various personal computer exhibitions. In the end, Moonlight Flash won the first prize of \$1,000 and Moonlight Express the prize for the best learning mouse.

The mice had to make their way through a maze. A few managed it. Some got half way and turned back. Most failed — or aborted, as the Americans say.

The competition was part of the personal computing fair which was run for the third time in parallel with the main NCC exhibition.



Moonlight Express was declared the best learning mouse in the contest.

Micros shape DP's human face

"We are introducing a David to challenge our own Goliaths," Univac president Richard Gehring told assembled journalists enjoying a plush breakfast at the Plaza Hotel when he introduced the new Univac 1100/80 series (CW, June 14). Meanwhile, elsewhere in New York, while Davids were collecting their software stones and \$100 slings ready to challenge the entrenched computer industry and

computer professionals.

Gehring's reference to Univac's Goliath tried to span the pioneering computer work of J. Presper Eckert, who helped design Eniac, one of the first electronic computers, and who was present at the Plaza breakfast to witness the launch of a progeny of a power and capability beyond the dreams of 30 years ago.

But the 1100/80 is still part of

Malcolm Peltu looks at how the personal computing enthusiasts at the NCC in New York began teaching some old computer dogs some new human tricks

The industry tradition which was spawned by the early computers and is subject to the constraints imposed by having to

satisfy an existing customer base with a heavy investment in software and resources.

The personal computer mar-

ket, however, is unrestrained by the past. It is being propelled by the grandchildren of the pioneers; and it is starting where the traditional computer industry has too often ended — with the "real user".

The personal computer exhibition and conference at the NCC is put into perspective by its relation to the mainstream exhibition and conference. In its own right, the personal computer market is of limited interest to the general computer industry.

However, every computer product designer should carefully take note of the way in which the personal computer market has spawned systems with genuinely easy to use, human interfaces.

**MORE NEWS FROM
THE NCC —
PAGES 18 and 22**

The Apple booth at the Hilton Hotel, for example, was ablaze with colour graphics and music synthesizers, with automated "puzzlers" and odds to computers — and with the bread and butter small business packages which take on an imaginative new light when dressed in human colours.

The importance of this human face of personal computing was vividly highlighted in a session in the main NCC conference on computing for chief executive officers. The panel included a professor from the Harvard Business School, business consultants and a vice-president from the Chase Manhattan Bank. Their view was generally a pessimistic one of the ability of chief executives to understand and use computers for their own applications in running the company.

Then, during question-time, personal computing guru Ted Nelson, author of Computer Lib, made the point that this gloomy view was a condemnation of the human engineering of existing systems. "What we want is interactive, graphic, vivid, clear, easy to use terminal interfaces. Then the chief executive and everyone else will be able to take advantage of computing power," Nelson commented.

To enthusiastic applause, he commented, "We do not need better computer products but better computer art."

In the 82 exhibits in the crowded personal computer exhibition hall in the Sheraton Hotel and its associated handful of private presentations, mainly from schoolchildren, there was far more ingenuity of computing application than in the four floors and over 400 exhibitors whose slick sales staff and booths provided the main focus for the visitors who swarmed through New York.

Bright ideas come to life

WALKING around the personal computer exhibition at the NCC, one would not be surprised to come across a scrawled sign stating "Micro-controlled R-brush kit and rocket launcher, Charlie Brown Jr. 12."

At this year's exhibition there were two distinct personal computing sections: the stands showing the emerging array of personal computing equipment from purely commercial suppliers; and then, intermingled with these as well as in a special competition section, the presentations of individuals whose bright ideas had taken on micro form.

One of the most startling stands was set up by Amstar, the Radio Amateur Satellite Corp, which is about to launch the world's first personal computer "switchboard" into space.

Then there was Nicky Naimovich Jr, president of Parsec Inc, a science-oriented, Dallas-based corporation engaged in the study and practice of energy conservation. On display he had his lunar 8080 microcomputer exhibit showing how to calculate energy losses in a house and also a new house insulation material which Parsec is now marketing under the name of Therma-Brite. This is claimed to cut out the major cause of heat losses as identified by his program — cracks in the wall.

In addition to being president of Parsec, Naimovich is also a high school student in Dallas, and, two years ago, at the age of 15, he was exhibiting his first micro development, a system to identify the times and places of the eclipses of the sun.

Elsewhere, artificial intelligence was well in evidence with Herb and Terrapin. Herb stands about three feet high and moves along like a Meccano Dalek. When it bumps into an object it reverses and wheel wobbles away. It is the invention of 16-year-old Holden Chino of New York.

Terrapin is a development of the Logo turtle artificial intelligence research work at the Massachusetts Institute of Technology and Edinburgh University.

The Logo Turtle project was concerned with the way in which a mobile "robot" could be used in teaching situations. An undergraduate at MIT thought this could be an interesting device for personal computer enthusiasts and he brought in a friend, David McClees, a Harvard graduate, to turn the turtle into a commercial product.

The result is Terrapin Inc in Boston, selling at \$800 for an assembled Turtle kit \$400 for a kit which can be interfaced with most home computers.

One of the youngest exhibitors was 14-year-old Andrew Shonman, of New York, who had used his TRS-80 to develop a system which calculates and displays positions of the stars and moon.

The personal computer exhibition also put its money where its theory lies and used an Apple II as the basis of its own information and message service, provided by one of the numerous computer stores, Computer Mart of New York.

At this stage, however, it is too early to say how the information system has developed to answer the most interesting question asked by the personal computing enthusiasts: what are the possibilities for the use of human ingenuity in the use of the micro?

PERKIN-ELMER

DATA SYSTEMS NEWS

ISSUE NO 6

A new market leader

The new Perkin-Elmer Model 3220 second generation Supermini, launched here last month, is already establishing itself as the most successful product in the history of Perkin-Elmer's Computer Systems Division.

Corporate results hit new high

Perkin-Elmer's third quarter sales and profits continued the positive trends of the first two quarters. Sales for the quarter rose 26 per cent over the same period last year and totalled \$109.2 million.

Net income increased 30 per cent to total \$13.2 million. Sales for the nine months of \$78.4 million were 29 per cent above last year, while net income advanced 57 per cent to \$4.9 million.

As has been the case in the last two quarters, each of the company's five business units contributed to both the sales and profit gains.

Orders through the nine months were up 34 per cent over the same period last year and totalled \$261 million.

3200Team under starters orders

'Out in front with the 3200 Team' was the theme at the Perkin-Elmer International Sales Conference at the Skyline Hotel, Heathrow, last month, at which the main event was the launch of the new Series 3200 range of Superminis.

Attended by company personnel and distributors from all over Europe, the Middle East and Africa, as well as the UK, USA, Canada and Japan, the Conference established and briefed teams of professionals to sell and support the 3200 Series, which has already made a major impact in the USA since its release there in February.

Library management at Leicester Polytechnic

Commissioning trials of a new computer system at Leicester Polytechnic have commenced. Based on a Perkin-Elmer Model 6/16 Mini, the system is supporting the Library lending services and is the outcome of an extended evaluation by library and computer staff.

The study also led to the change-over to automated catalogue on microfiche for the library of some 100,000 books and other reference media.

TRANSACTION PROCESSING

The application is, in fact, shared between two computers. Real-time transaction processing, enquiries and controls are managed by the Model 6/16, whilst follow-up batch processing is handled by an existing B6700 mainframe on the basis of a magnetic tape journal of each day's transactions.

The heart of the real-time system is the 'Loans' file and with it the directly associated 'Index' file, the purpose of which is to provide a cross-reference to the loan record in the 'Loans' file.

when the enquirer knows only the item identifier.

REDUCED LOSSES

An important feature of the system is its ability to place stops on lending where, for example, a student nears the date of his leaving the Polytechnic or has persistently failed to return books on time over a period.

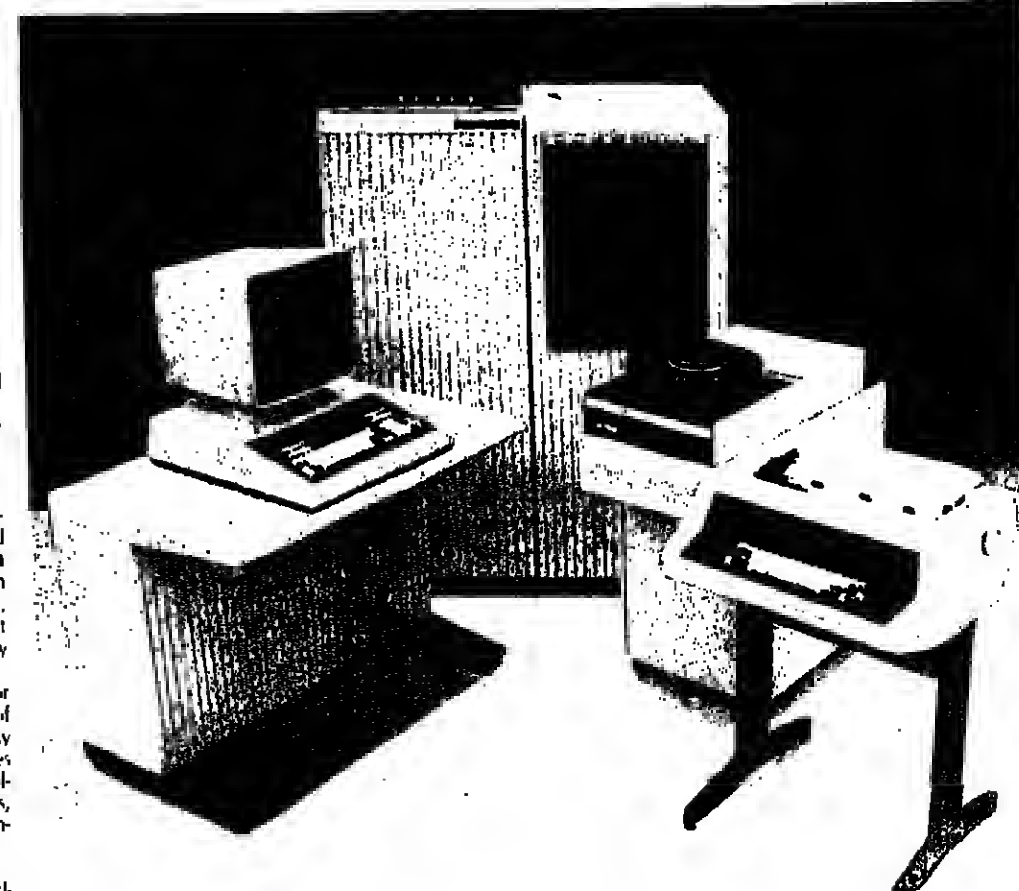
This feature is expected to reduce considerably the level of book losses to the library.

MAJOR BENEFITS

The real-time system comprises the Perkin-Elmer Model 6/16 with 64Kb of memory, 10Mb of disc and a tape drive. There are seven teleprinters to read the bar codes on books and on borrowers' tickets, and two operator VDUs.

When fully operational, the system will confer major benefits, not only in respect of reduced book losses but also by making possible a much better service to borrowers, simplifying many administrative tasks and providing much useful statistical and other information required by the growing library.

"Advertisers Announcement"



Multi- user system for £20 K

Users of time sharing utilities and those who normally queue for access to a minicomputer, should look into new software releases from Perkin-Elmer.

A very low cost multi-user system can be acquired following the announcement of enhanced software for the Series 3200 minicomputer.

EDITING

Based on the OS/32 operating system, features include sign-on, password and account numbers, command language, editing software for interactive program development, scheduled job queues for background batch processing and output scheduling, media test tape printing.

MEMORY ALLOCATION

Memory partitions are allocated at run time according to the number of users, the facilities required and the total amount of storage.

Compilers available include FORTRAN IV (Extended) and CIRAL 66. Also available is BASIC in the form of a run time interpreter and CAL, Perkin-Elmer's Assembler with an optional MACRO version.

Price for a typical hardware system is just over £20,000 and includes 128Kb of MOS memory, a matrix printer, 10Mb of disc and a floppy disc drive interface and one terminal.

Personal number cruncher

What sort of business, privately owned and employing only a handful of people, could afford to own a £40,000 computer? Manifestly, only one in which success would be directly attributable to its profitable use.

Such an unusual business is Wakefield and Imberg, a professional engineering design practice based in Stamford, Lincolnshire.

AUTOMATION

Specialising in the design and construction management of civil and mechanical engineering equipment, Wakefield and Imberg, whose Managing Director is a passionate believer in "small is beautiful", are determined to automate everything that can avoid increasing administrative staff and the kind of problems

that would turn him into an administrator.

MULTIPLE USES

The computer system is based on a Perkin-Elmer Model 6/16 minicomputer coupled to a graphics display terminal, a 30-inch drum type automatic draughting machine and a printer. The computer has 64Kb of memory, 10Mb of disc and is programmed in FORTRAN.

Primarily intended for the development of structural analysis, equipment design, automated draughting and customer quotations, the system will also be used for project accounting and invoicing.

COMPETITIVE

Major benefits claimed for the system are, firstly, a truly dramatic

reduction in project duration, from design to commissioning and, secondly, the possibility of analysing designs more thoroughly and in different ways.

Both these benefits represent substantial competitive advantages to Wakefield and Imberg, whose highly specialised expertise is now repeatedly sought by many of industry's most illustrious names.

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Major benefits claimed for the system are, firstly, a truly dramatic

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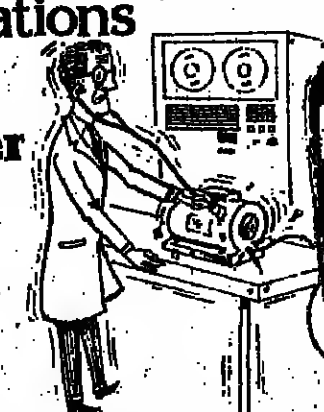
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The following statistics apply to our current situation but we will need to expend them by about 50% over the next two years.

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Interested suppliers should submit their proposals, in writing, to the County Purchasing and Supplies Officer, Humberside County Council, Supplies Division, Antwerp Road, Sutton Fields Industrial Estate, Hull, North Humberside, by no later than Friday, July 6, 1979.

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MORE NEWS FROM THE NCC

With over 4,000 booths and nearly as many companies vying for attention, the NCC presented the biggest concentration of computer

equipment on show in the US this year. Here TIM PALMER and CHRIS HIPWELL report on more of the products on offer.

800 is twice as good says Harris

NEW from Harris at the NCC was the Series 800, featuring two models, the 850 and the 870.

The 800 offers between 1.5 and 2 times better performance than the S/500, introduced at the 1978 NCC, and this is achieved by use of a pipeline processor which can be prefetching and executing up to seven instructions simultaneously.

Not a true 48-bit processor, it nevertheless has a 48-bit data path throughout the machine; the register alze is the standard 24 bits used on all Harris machines. It runs the same Vulcan operating system used throughout the Harris series, but features additional instructions over the S/100 line.

The 850 costs from \$280,000 to \$300,000, compared with

\$180,000 to \$200,000. Harris installed about twenty-five 800s in the first year of marketing.

Harris also showed its new 1670 communications system, which is built around an emulation of the Interdata mini Harris formerly used in the 1600 series, which is manufactured in-house.

Key features of the 1670 are concurrent RJE, local batch, data entry, local interactive, and 3270 or Uniscope interactive processing with IBM or Univac hosts. Up to 16 IBM 3270 interactive terminals can run concurrently with up to 16 keystations, and Harris has completely rewritten the operating system for the new processor.

General Automation launched the SAFES Swift and

Foreign Exchange System package, developed in Europe, at the show, and got strong response from bankers.

Computer Automation has redesigned its Naked Mini 4/10 board computer so that it fits into a small, compact box for process control applications. The new version, which like the 4/10 is built around a 16-bit Computer Automation-designed LSI chip sets, is called the 4/04. The 4/04 is offered at under \$1,000 with 18K words of memory.

Underlining once again the free-for-all opened up in the minicomputer market by the bit-slice microprocessor, Ampex has been offering its own minicomputer for 12 months now.



The Kennedy Series 7000 was one of several Winchester-type fixed discs on display. This model can store up to 12 Mbytes.

Productivity boost claimed by Prime for Cobol generator

A COBOL program generator claimed to give a dramatic boost to productivity was demonstrated at the Prime stand by David Black and Associates of Pittsburgh.

Designed for use with any machine for which an interactive Ansi 74 Cobol development system is available, it is already being widely marketed by Prime; Data General is showing keen interest in adopting a version; and it is also running on DEC and Univac machines.

One claim for it is that a bill of materials processor consisting of 20,000 lines of Cobol was developed, debugged and tested in 10 days.

It is designed to produce efficient Cobol code through a question and answer sequence, and maintains a data dictionary of all files and their contents. It supports data entry, reporting and utilities, and is claimed to offer considerable aids to debugging and testing.

It is licensed for the particular machine the user intends to run it on, is marketed in the UK through Prime International, and costs \$25,000. Maintenance is \$2,000 a year, with two new releases annually.

Multi-host options on Paradyne's Pix II

MAJOR software extensions have been added to Paradyne's Pix II communications processor, enabling users to build multi-host networks around IBM mainframes, access different applications and software subsystems on the miniframe from a single terminal, all without touching or adding to the software on the IBM 370 or 303X host.

The enhanced version of Pix II is called Pixnet, and runs on the same standard processor already used by Paradyne as the local and remote control unit in a Pix II network.

Pixnet adds a key element to the standard Pix II repository of controllers, a network control unit. All three processors use the same hardware, a Paradyne emulation of the General Automation 16/220 microcomputer with some additional and some additional instructions.

The network control unit performs the functions of directing terminal messages to the right application on the miniframe, and of line concentration. A local control unit is still required at each miniframe, and at least one remote control unit at each terminal site.

The network is initialised in the network control unit. On the miniframe, the required number of device addresses are made available to system programs like CICS and TSO under which applications to be remotely accessed are running. Requests

for these applications from the terminal sites are then directed to the host via the NCU, and the host accepts the messages as if they came from a local peripheral.

The network control unit nodes also handle routing of messages through the network, and data is carried in packets similar to IBM's SDLC frame.



AM International subsidiary, Jacquard Systems, gave demonstrations of its J100 small business system, which attracted considerable interest throughout the show.

Tripling of disc traffic

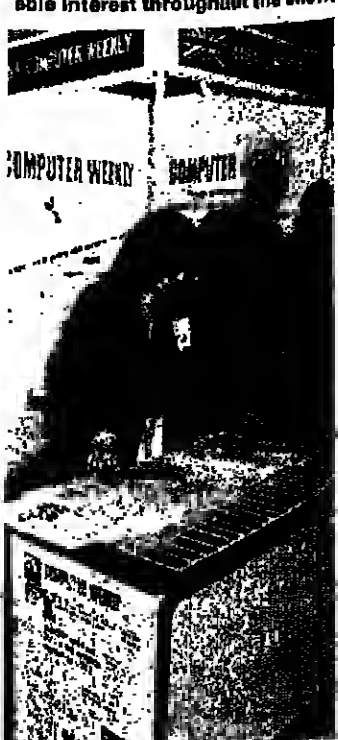
A SEMICONDUCTOR memory unit which emulates the 18M 3380/3630 and 2308/2808 disc subsystems has been introduced by Intel.

Called the FAST 3805, the new unit is totally transparent to the CPU and, because access times are extremely fast, it is claimed that the 3805 can triple disc traffic without adding new channel or controller capacity.

The new unit incorporates an Intel 8086 microprocessor which manages the IBM 370/303X channel protocol and emulates the interface between the 370/303X channel and the 2835/2308 or 3630/3380 controllers/disc systems.

The micro also carries out double bit error correction and records the chip location of any errors.

Storage of the FAST 3805 ranges from 12 to 72 Mbytes and data can be transferred at speeds ranging from 1.5 to 4.0 Mbytes per second.



Europe's most widely read computer newspaper, Computer Weekly, was a focal point of the exhibition, and attracted a large stream of visitors.

LETTERS TO THE EDITOR

Implications of word processing

YOUR report headed 'Controversy over benefits of WP' (CW, June 7), includes two sentences which sum up the problem:

"Expensive machines were sitting unused in the corner of some offices... because there was not enough room for improvement in the areas of work they had been brought in to tackle."

"Some departments such as Social Security and the Army did, however, have good control procedures for WP."

Let's forget about electronic mail for the present. Word processing now is about the computerised typewriter. If you emphasise 'typewriter' you could persuade your purchasing manager to spend seven or eight thousand on a fancy machine just to try it. Stick it in the typing pool and let them play around with it. But don't go crying to the supplier if you don't get the benefits you expected. A typist knows about typing. She doesn't know about control procedures, systems analysis, or unintended side effects.

If you emphasise 'computerised' you will realise that you need to ask, 'What is the effect of introducing computer disciplines into the least organised area of the office?' When you try to answer that question, you will realise that word processing will never succeed without thorough systems analysis and tight control. If you simply split the work in two and give some to conventional typists and the rest to WP, it makes as much sense as dividing your garden down the middle, tending one half with a spade and the rest with a bulldozer.

Before you even consider WP hardware you need to examine your typing workload closely. First, do your weeding. Don't have anything typed unless it is essential. When you have identified the essential typing, look at its message. Is it clear? An author may know his subject

but that won't automatically make him a good writer. Author training is the first essential of successful WP.

Identify areas for standard text. If you compose your standard text carefully, the emphasis of your author training will be on selection and combination of appropriate blocks. If you have standard descriptions of your products, for example, the author must know when and how to use each description. He won't need to struggle with his own attempt at a description each time.

Think about words on paper. Do you have standard layouts for letters, memos, reports? Does each author give his own instructions? Do you leave it all to the typist? Preliminary work here can save hours of trouble.

Think about paper. How many shapes and sizes do you use? On how many does the type have to line up with printed text or boxes? How accurate is your forms design? Consider seriously whether you can use continuous stationery. You'll save hours if you can, but remember you'll need to decoliate and gullotine — a pair of scissors won't do. Think about collection and delivery of work; streamline the entire paper-handling system.

When you've done all that, talk to a supplier. Get into the machine and compare its facilities with your requirements. Do the facilities suggest better ways of designing your system?

When you've designed the system to make best use of the new technology, write it up. Yes, that old bore documentation is essential. You are dealing with a computer.

Make sure authors and typists are fully trained and have adequate documentation, but be ready to amend it. A flexible system is essential to allow for the erratic demand for typing services. Remember a typist knows about typing — once she understands the machine her suggestions will be valuable.

The trouble is that WP software is so flexible, and some machines so cheap, that it's easy to get a machine and use it without thinking through the implications. WP suppliers tend to sell hardware and software products. Perhaps they could consider providing a systems consultancy service — or perhaps there should be more independent consultants.

Much of what I've said may sound obvious, but some of the comments about WP suggest that it's not obvious to everyone. Incidentally, I've managed a Wordplex 7 system on these principles for the last year or so. The work is a mix of standard letters, boilerplating and text editing. The average typing productivity increase is 100%.

PAUL HUDSON
Bradford, Yorkshire.

No joke at all for some

YOUR leader on June 7 did not dig deeply enough. The gross misconceptions about the nature of digital electronics which abound among laymen have as their root cause the nearly equally gross misconceptions about the nature of digital semiconductor electronics which pervade the computer industry. So long as we continue to allow so-called 'Computer Science' courses staffed by programmers to take in students with no grounding in physics and then give them no training in hardware, paranoid ignorance will continue to pervade the computer industry and leak out into the media and society at large.

Si Albans.
IVOR CATT

An under-used qualification

FURTHER to George Penney's letter headed, 'Why programmers are in short supply' (Letters, May 24), colleges have for many years run courses for computer programmers. At my own college we run a full-time course based on the CGLI 747 (Computer Programming and Information Processing). This is a nine-month course (one academic year) and covers the educational requirement of the certificate, but allows us to improve the students' general education and provide some basic training.

The 747 syllabus is biased towards practical programming, but the theoretical aspect is not neglected.

Mainly our students are school leavers, many without academic qualifications (we have our own selection procedure). Students who display an aptitude for programming can develop their talents and have, on completion of the course, a

folder of written programs (albeit small, but nevertheless relevant) to enable employers to evaluate their potential. The less able (in this direction) secure employment as data control clerks, etc.

The staff feel we make a valuable contribution to the practical commercial field of programming and regret that this certificate is not more widely recognised.

The BEC/TEC committee has published details of its National Awards in Computer Studies and these are designed to enable the not too 'academic' to embark upon a career in business programming.

If employers or students are interested in courses, they should contact their local college, who will be pleased to send them details.

DIANA HOSSACK
South Thames College, London.

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Please send me the full PT7 story.

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Simonsway, Manchester M22 5LA

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Compec is sponsored by 'Computer Weekly', 'Data Processing' and 'Systems International', the leading UK computer publications, with the support of other ITC Business Press specialist publications.

Please pencil us in as prospective exhibitors and send a brochure to the undersigned.

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MYRIAD

PROJECT LEADERS DEVELOP SYSTEMS FOR EUROPE

BERKSHIRE

Circa £8,250

Several outstanding opportunities exist for skilled professionals to join the Information Systems development group of a highly successful multinational manufacturing company, with its U.K. headquarters located in Reading. The Group, a multi-disciplined team, is responsible for the development of a varied range of new systems for the Finance and Administration aspects of the company's operations throughout Europe, providing vital business information to individual profit centres. An extensive international communications network links the European organisations, facilitating rapid interchange of data and providing on-site operation with either local or remote processing facilities. The person appointed will be responsible for project leading the development of a range of international business systems. Self motivation and a high level of personal communications skills play a vital role since this position will require extensive user contact, business and systems analysis, the ability to liaise and work closely with all levels of management and may involve some European travel. These are first-class opportunities for ambitious candidates to gain and apply valuable experience in a dynamic organisation. Prospects for future career progression are excellent providing scope for individual development. A good commencing salary is offered and relocation expenses will be considered where appropriate.

Ref: SW1/2108

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MIDDLESEX

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Two highly professional and ambitious SYSTEMS ANALYSTS are required to join project teams developing large, multinational systems that will be implemented throughout Europe. Opportunities will arise for overseas travel. Applicants will possess a strong data processing background with analysis experience gained in a senior capacity on large commercial systems. Formal training in systems analysis will be an advantage, as these positions require persons who are able to communicate effectively at middle management level.

Successful candidates will investigate and define users problems, prepare feasibility studies and systems proposals. They will also accept responsibility for a maximum staff of twelve and monitor progress through all phases of development.

The modern offices are well serviced by public transport and ample car parking is available. Employee benefits include generous relocation expenses, a full pension scheme and a subsidised staff restaurant.

Ref: ST/2109

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BERKS/BUCKS BORDER

TO £7,000

Our client, a successful manufacturing company, is at present undertaking the development of several new on-line application systems and now wishes to recruit analyst programmers and programmers with the potential to develop into the analyst programmer role in the future.

If you can offer:

- * A minimum of eighteen months' commercial COBOL programming experience.
- * Some experience of systems analysis and design or a strong desire to progress into this work
- * The drive and enthusiasm to succeed in a project oriented environment

The company can offer:

- * Training in advanced IBM software
- * Experience of a variety of applications projects
- * Development of COBOL programs utilising database and teleprocessing
- * Excellent starting salary and conditions of employment
- * 25 days' holiday

This is a very attractive opportunity to join a professional progressive thinking data processing development team.

Ref: NW1/2108

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PROGRAMMERS

£7,000

ASSEMBLER: FORTRAN: MKIV: PL1: COBOL

Expansion within our client's International Systems Centre has led to internal promotions opening up significant opportunities for candidates within a professional team servicing some twenty member companies throughout Europe and Africa.

Successful applicants will be involved in on-line programming for a variety of technical projects or development of a database system, which will consolidate our client's future operations.

Using IBM 3031 equipment you will require a minimum of one year's programming experience in a relevant language. A knowledge of IBM OS or database would be advantageous, although the company will provide comprehensive training where necessary.

Highly competitive salaries are complemented by an exceptional benefits package. This includes sickness and pension schemes, flexitime, subsidised restaurant and a lively sports and social club. For those wishing to move to the area a generous relocation package will be offered.

Ref: SE1/2108

MYRIAD APPOINTMENTS LIMITED

30 Fleet Street London EC4Y 1AA

01-353 0981

Software Professionals

Thanks for your support..

Digital is the world's leading designer and manufacturer of minicomputers. Our products are built to solve problems and as more businesses are turning to minicomputer-based systems this has created one of the most exciting growth areas in computers today—particularly in the

communications field. An important part of our success has been the emphasis we place on the high quality of software support demanded from and achieved by our Software Services Function.

Software Services is a vital backup for our customers and sales force. It is an integral part of the team that maintains our reputation for professionalism and effectiveness—a team which can call at any time on the substantial resources of the Digital Equipment Corporation.

Opportunities to join the Reading-based back-up team at a senior level are few and far between. People capable of filling such positions will be those with a rare combination of talent, experience and personality and yet we now require THREE of them, each for a specific area of minicomputer applications.

Communications Specialist

You must have either experience of Digital software or a general Communications background. A knowledge of RSX-11, DECNET, UN1004, MUX200, NTR and/or hardware would be a distinct advantage.

Each of these positions is a vital senior role providing support for Digital products. Each of you will act as a technical focal point providing information and advice to field specialists and managers up to European level. This could involve significant travel throughout the UK and Europe.

The roles are challenging and intellectually stimulating, offering salaries between £8,000 and £9,500 a year, plus a company car or car allowance. There are also comprehensive benefits including relocation assistance where required.

You'll like the atmosphere we've created at Digital.

We're a progressive, modern, informal and highly professional organisation—one which has managed to combine tremendous commercial success with the all important human touch. Personal and professional development is actively encouraged with the opportunity to become involved in new products such as VAX 11 780. As we're rapidly expanding and a people orientated company, promotion prospects are excellent.

For more information on these and other opportunities within the U.K. talk to our Support Group Manager, Stuart Mackenzie, on Reading 583555. Or if you prefer, write to him with sufficient details to make an application form unnecessary at: Digital Equipment Company Ltd., 2 Chapseldale, Reading, Barks. Please quote ref 604.

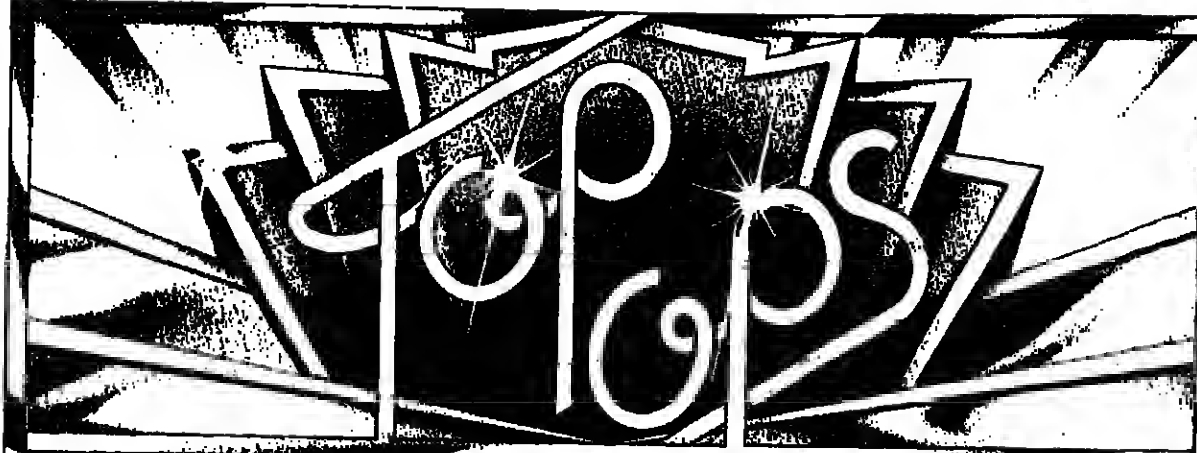
Emulator Specialist

You must have experience of either Communications or Digital Software. A knowledge of mainframe emulators (e.g. UN1004, MUX200, NTR), RSX-11 or DECNET would be a distinct advantage.

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Salary: up to c. £16,500. Role: technical rather than managerial. Essential experience: Real Time Mini + telecommunications.

Systems Analysts

Salaries: Up to c. £16,500. 4 years' Real Time Mini experience — telecommunications.

Analyst — Programmers

Salaries: Up to c. £14,500. 2 years' Real Time Mini experience — telecommunications, if possible.

A good degree (or equivalent) is an additional requirement in all cases. If you speak German, that's an advantage. (If you can't, our Client will pay for a one-month crash course.) Process control or flight simulation background would be especially useful, too.

Arrangements for living accommodation, funerals, holidays and travel expenses are well advanced and on generous terms.

To apply, just pick up the phone and dial Real Time Mini on 01-836 9719 or 8682.
Ask for Beryl McLaren. Any time — day, night or weekend — you'll get a personal answer.

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MYRIAD INTERNATIONAL PRODUCT CONSULTANTS

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TOTAL CIRCA £14,000
PLUS EXPENSES

Four outstanding persons are required to form a new department within a leading, multi-national organisation based in S.W. London. Operating as an integral unit, the persons appointed will be responsible for implementing a five year strategic and operational plan for the development and expansion of major computing facilities in the four business areas specified above. Each Consultant will specialise in one of these areas to establish and advise marketing/sales teams throughout the world, ensuring efficient policies are being pursued. They will possess a comprehensive knowledge of potential applications areas in order to identify and exploit future markets to which modern computer technology can most effectively be applied.

Candidates should offer

- * IN-DEPTH EXPERIENCE OF ONE BUSINESS AREA
- * ENTHUSIASM, CONFIDENCE AND MATURITY
- * COMPUTER SYSTEMS BACKGROUND
- * THE ABILITY TO COMMUNICATE EFFECTIVELY WITH SENIOR MANAGEMENT

The Company is able to offer exciting career opportunities in a very rewarding environment, coupled with the security of a major U.K. organisation. Salaries are negotiable and will not be a problem for applicants with the required skills.

REF: S2/1406

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UMRCC

University of Manchester Regional Computer Centre

Director: Professor Gordon Black

Expansion creates further opportunities to join one of the foremost computer centres in Europe

UMRCC is a national centre providing a general service to over thirty universities in the United Kingdom. This is currently based on two Control Data 7600 computers each front-ended by an ICL 1900. A CDC CYBER 72 provides an interactive service to Manchester users, accessed by over a hundred terminals.



SYSTEMS GROUP

OPERATING SYSTEMS

Lead a team responsible for the development and support of the OS/VS1 operating system on the ICL 1900 and 1905 computers. For this major appointment you should have in-depth knowledge of OS/VS1 and ideally experience in leading a team of programmers. If you have less experience you could be a member of the team. Current projects include the implementation of the North West Universities Network System (NUNWS), the investigation of the various subsystems, and replacement processors. Ref: 124/79/CW.

COMPILERS

Help to provide, maintain, and support a wide range of compilers. You should have experience of compilers and systems programming, together with a knowledge of FORTRAN and one other high-level language. A knowledge of COBOL and ICL 1900 systems would be an advantage. Ref: 125/79/CW.

The salary will be on the scale £3,650-£6,100 p.a. which will increase to £3,775-£6,330 p.a. in October, 1979.

RESOURCE CONTROL SYSTEMS

Assist in the provision of resource control software. The successful candidate will be working with a team responsible for the development and support of software to monitor and control computer resources allocated to users. You should have experience of program resource allocation, design, implementation and testing. Ref: 126/79/CW.

The salary will be on the scale £3,650-£6,100 p.a. or £4,322-£7,145 p.a. depending on experience. These scales will increase to £3,775-£6,330 p.a. and £4,333-£7,351 p.a. in October, 1979.

COMMUNICATIONS SOFTWARE

Develop software for packet switching to link the ICL 1900 computers to the Post Office PDS via a GE 4070 processor. You should have a successful record in implementing software systems and the ability to lead technical development. It is essential. Experience of real-time systems or computer networks would be an advantage. If you have less experience you could join the team at a lower grade. Ref: 127/79/CW.

The salary for the senior programmer will be on the scale £3,888-£6,432 p.a. which will increase to £7,227-£8,992 p.a. in October, 1979. The salary for the programmer will be on the scale £3,650-£6,100 p.a. or £4,322-£7,145 p.a. depending on experience. These scales will increase to £3,775-£6,330 p.a. and £4,333-£7,351 p.a. in October, 1979.

INTERACTIVE SYSTEMS GROUP

INTERACTIVE SYSTEMS

Join a new interactive systems group. Two programmers will be appointed to work with a team responsible for the development and support of the services based on the CYBER 72 running under the NOS operating system. Current project areas include system performance monitoring and analysis, database management, and planning future developments. You should have some experience in systems programming, preferably on Control Data computers. Ref: 128/79/CW.

The salary for both posts will be on the scale £3,650-£6,100 p.a. or £4,322-£7,145 p.a. depending on experience. These scales will increase to £3,775-£6,330 p.a. and £4,333-£7,351 p.a. in October, 1979.

USER SERVICES GROUP

APPLICATIONS SOFTWARE

Help to support and maintain a wide range of applications software. The principal activities of the successful candidate will be concerned with software provided to users at Manchester who have access to the local interactive facilities. It is essential. Experience of real-time systems or computer networks would be an advantage. If you have less experience you could join the team at a lower grade. Ref: 129/79/CW.

The salary will be on the scale £3,650-£6,100 p.a. which will increase to £3,775-£6,330 p.a. in October, 1979.

INFORMATION AND DOCUMENTATION

Work with a team which produces manuals describing the computer services offered to our 1,000 users. Particular emphasis will be placed on documenting facilities available on the local CYBER 72 interactive platform. The appointee will also be expected to take part in the advisory service provided to these users from the University of Manchester. Ref: 130/79/CW.

The salary will be on the scale £3,650-£6,100 p.a. which will increase to £3,775-£6,330 p.a. in October, 1979.

LIAISON AND TRAINING

Join a team which maintains contact with representatives of the University and departments that require a computing service from the UMRCC. The person appointed will be advising and helping users with a wide range of background and experience. You should be interested in dealing with people and have a knowledge of one or more high-level programming languages. Ref: 131/79/CW.

The salary will be on the scale £3,650-£6,100 p.a. which will increase to £3,775-£6,330 p.a. in October, 1979.

OPERATIONS GROUP

COMPUTER MANAGER

Supervise the day-to-day running of the large batch systems. The person appointed will be responsible for the standards of operation, the production of records of equipment performance, and for stock control of consumable materials. An essential part of the job will be liaison with systems programmers and engineering maintenance staff, and supervision of operations staff through intermediate supervisors. Previous management experience in these areas or technical qualifications and experience at a high level would be an advantage. Ref: 132/79/CW.

The salary for both management posts will be on the scale £3,888-£6,432 p.a. which will increase to £7,227-£8,992 p.a. in October, 1979.

TECHNICAL SERVICES MANAGER

Be responsible for the supervision of the CYBER 72 interactive system and the all-line facilities. The successful candidate will be expected to play a leading role in the installation and introduction of a microfilm/line service. In addition, a large magnetic tape library and other off-line facilities will be under the control of the appointee. Previous management experience in these areas or technical qualifications and experience at a high level would be an advantage. Ref: 133/79/CW.

The salary for both management posts will be on the scale £3,888-£6,432 p.a. which will increase to £7,227-£8,992 p.a. in October, 1979.

Benefits include a good pension scheme and generous holiday entitlement. If you would enjoy the challenge of working in a stimulating environment, with the prospect of a rewarding career, send for further information and an application form (returnable by 28 June 1979) to the Registrar, University of Manchester, Oxford Road, Manchester M13 9PL, quoting the appropriate references.

JBA

Prestel/Viewdata Specialists

Germany from £20,000
Immediate vacancies exist for consultants who have considerable experience of information transmission systems, such as Prestel, Viewdata, etc. Data communications expertise and database knowledge is vital to the positions, particularly where concerned with large mainframes and front-end processors. A user contact background is desirable.
Our client is one of the largest consultancy organisations in the world with over 3,000 employees. On this solid foundation, the company offers a top-market remuneration package and excellent relocation assistance. Further, the prospects of continuation of projects at very senior levels in a worldwide market place is virtually second to none.
Contact: Mike Creamer

Data Base Consultants

London based neg. to £12,000
Applications are invited from Senior Data Base Specialists with a wide computing and business background to join a leading consultancy. Candidates should have experience of special analysis and design methods appropriate to the data base approach, have worked with at least one of the proprietary systems and be able to compare the different types of solutions available. Appointees will be required to work on a variety of client projects, ranging from advising on feasibility through to the detailed design and implementation of specific applications. The ability to work in a sophisticated environment, coupled with the drive, personality and technical expertise to communicate on the same level as senior managers is of paramount importance.
Contact: Margaret Stevens

Systems Programmers

Munich DM 65,000 - 90,000 + benefits
Permanent positions are available with one of Germany's leading hardware manufacturers, for experienced IBM Systems Programmers who possess a minimum of 3 years experience.
DOS/VS, CICS, POWER/VS (or any other type of spooler) expertise is of most interest, although OS or MVS could also be of considerable value. All successful candidates will receive full relocation expenses, including agents fees, an initial family separation allowance and a minimum of 6 weeks holiday per year (plus all statutory holidays). German lessons will be provided.
Contact: Andy Wright

For further information on any of the above vacancies, please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.
JAMES BAKER ASSOCIATES, International Personnel Consultants,
16 Maddox Street, London W1. Tel: 01-491 4478

Software Specialists

Homa Counties up to £9,000 + bonus
A major software house, with an impressive growth record, is continuing to expand and currently has vacancies for Programmers and Designers to work on the development of middleware associated with established operating systems. Candidates should have at least 3 years experience working on software such as OS, DOS, VME-B/K, communications or net works. A background of implementing large mainframe systems, perhaps with a monofractor would be an advantage.
Excellent salaries, relocation assistance and profit sharing scheme.
Contact: Jim Baker

Technical Analyst

Bracknell neg. £7,000 - £8,000
This is an outstanding opportunity to join a successful British Air Freight Forwarding Company, to help consolidate and expand the operation of its still relatively small d.p. function, both here and overseas. The company runs a worldwide network of minis, so although specific hardware experience is not required, candidates must have a thorough understanding of the concepts and possibilities of network processing. A sound knowledge of accounting/financial applications is, however, essential and must be combined with the ability to work at a detailed technical level.
Company benefits include an excellent pension scheme plus medical and life assurance - generous relocation expenses can also be made available. Two salary reviews per year can be expected.
Contact: Andy Wright

Programmers & Analysts

South of England up to £6,000 + mortgage subsidy + benefits
One of the most prestigious insurance services companies in the UK with an impressive 40% growth factor last year, are recruiting additional staff for development work. Many systems are under way including installation of a DMS 2 database and a large real-time terminal network. Completion of these projects opens the way for a considerable number of additional systems thus ensuring creative work for the future.
Programmers must have at least 18 months COBOL experience in a batch or real-time environment. Analysts should have real-time commercial or accounting applications experience. First class location, outstanding employment package and a realistic career growth. Call for more details.
Contact: Mike Creamer

Recruitment Consultants

Mayfair £10,000+ on target

We are a professional executive recruitment consultancy with a sound reputation and a proven record of success in several disciplines. We are seeking self-motivated entrepreneurial individuals with the potential to establish firm client bases and handle major advertising and selection campaigns. Thorough training will be given. Additional benefits include company car scheme, bonuses, etc.

Ideally in your mid-twenties to early thirties; you will be client/sales orientated and have achieved a level of success already in the Data Processing field. Experience of recruitment though preferable, is by no means essential. Strength of personality and the ability to negotiate at senior level will be important factors.

For more details contact Barry Litchford, Director on the number below.



**Lloyd Chapman
Associates**

125, New Bond Street, London W1Y 0HR 01-408 1670

Project Leader 'New Technology'

£8,000 + car

A small development unit is to be set up in the Southern Home Counties to plan and to put into operation computer-based methods of selling that will eventually serve a medium-sized printing and publishing group. A young project leader is needed to head this development; build up a team of about a dozen, select equipment, prepare and execute a technical development programme and implement pilot schemes. He/she should ideally be in 25-35 age bracket and have had some experience of print and of the new technology, but this need not have been in a line role—experience with a consultancy or with a manufacturer working in the field could well prove

sufficient. Computer Science graduates could be acceptable with relatively less practical experience, provided they have done enough to show that their ideas work. Salary and conditions are negotiable, but an initial remuneration of at least £8,000 + a car is anticipated. PA Personnel Services

Ref: TE98940ICW
Initial interviews are conducted by PA Consultants. No details are divulged to clients without prior permission. Please send brief career details or write for an application form, quoting the reference number on both your letter and envelope, and advise us if you have recently made any other applications to PA Personnel Services.

PA Personnel Services

Hyde Park House, 55a Knightsbridge, London SW1X 7LE. Tel: 01-235 6060 Telex: 27874



A member of PA International

D.P. MANAGER Crawley, Sussex £8,500 p.a.

The Unilock Group of Companies, leading European supplier of relocatable partitioning systems, is currently expanding its computer operations and intends to appoint a D.P. Manager to be directly responsible to the Computer Services Manager.

An ICL 2903 is already in operation and future planned developments include a major computer graphics installation. Applicants in the age range 25/35, should have experience in systems analysis and design and preferably a knowledge of Fortran IV or RPG II. The successful candidate can look forward to total earnings in the region of £8,500 p.a., together with participation in pension and medical insurance scheme. If appropriate, relocation assistance will be provided.

Applicants should send C.V. giving personal and career history to: John Devine, Computer Services Manager, The Unilock Group of Companies, Rutherford Way, Crawley, West Sussex RH10 2PD.

unilock

Programmers Managers in DP

Old Windsor

Are you desk-bound, unrecognised
and without prospects?

Then stand up and communicate
your knowledge and experience.

Our Training Division is expanding to meet the ever changing needs of our customers and staff. We are looking for programmers with 1/3 years' experience in COBOL, and also for supervisors and managers in systems, programming or operations to join our lecturing staff in Windsor.

The benefits of this rewarding career are numerous:

- ICL is Europe's largest computer manufacturer
- Starting salaries between £4300 - £5300, or more for the DP management trainers
- Training given in communication and lecturing skills
- Teaching others, meeting new people and increasing your own experience
- Natural career paths through ICL's product range
- Travel opportunities in the UK and overseas.

For more information, please write to us quoting ref. CW2414 to: Mr. Windor, ICL and speak to Mr. Windor or Mr. Windor's assistant, Elizabeth Sayers, ext. 201. ICL Training, Belmont, 11th Windsor, Bucks SL4 2P.



**International
Computers**

Think computers. Think ICL

ANALYST PROGRAMMERS/ PROJECT LEADERS £6500 to £7200+BONUS

Ladbroke Casinos are acknowledged as the leading company in what is a young, dynamic and very exciting industry. With four Casinos in London, soon to include the Ladbroke Hyde Park Casino, probably the most luxurious in Europe, and eight in the provinces plus an ambitious expansion programme, the Company is reviewing its total data processing strategy. Based on powerful minis we are about to start the design and implementation of a completely new on-line management information and control system.

Our hardware investment may well exceed six figures and equipment selection is now in hand. Plans include Batch, Interactive, real time, communications and distributed processing, covering machine accounting such as payroll through to signature recognition, COM, marketing and financial modelling. The Company offers a wide range of benefits from 12.5% holiday pay through to 12.5% holiday pay. If you have relevant experience to offer, preferably in a high level language and are prepared to make a significant contribution to our development effort right at the beginning of this exciting project, we can promise you a quick interview and genuine interest in your future career development.

Contact: Neil Lester,
Ladbroke Casinos, 01-499 8321 day, 01-952 1421 evening.



This progressive Company, manufacturing electronic road vehicles and industrial trucks, urgently requires an experienced

SYSTEMS MANAGER

To manage and develop systems on an on-line mini-computer installation in South Wales.

Salary offered c. £8,200.

Apply in writing to:

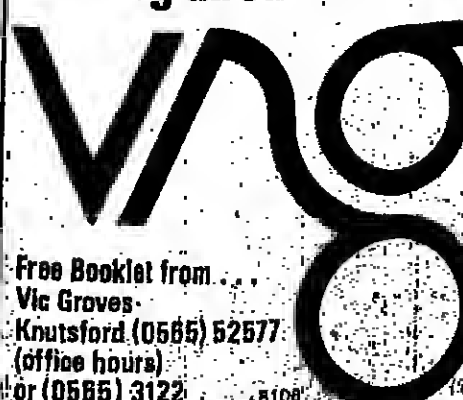
Mr. H. H. Clarke, Director
at the below address, or if preferred an informal out of hours meeting can be arranged to discuss this opportunity by telephoning the number below.

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MANCHESTER RPG II PROGRAMMERS
to £4,800
Our client requires a young RPG II programmer, preferably with some FORTRAN, and 2 years' 2900 experience. Good prospects with growing company.

NORTH CHESHIRE SENIOR PROGRAMMERS
to £7,000
Senior programmers with sound IBM or Honeywell experience are required for a fast-growing UK consultancy. Must be self-motivated. Wide range of applications available.

OLDHAM SYSTEMS ANALYSTS
to £5,100
Analysts with up to 2 years' financial or production control experience are sought by our client. Opportunity for progression and to see systems through.

STOCKPORT SYSTEMS ANALYST, PROGRAMMERS
to c. £5,000
In order to meet expansion our client is seeking a range of DP staff with a variety of experience. Programmers should have good COBOL or IBM/ICL ASSEMBLER BACKGROUNDS. Analysts are required with sound commercial experience. Salary and prospects excellent.

MERSEYSIDE ANALYST/PROGRAMMERS
£5,500
Client with large IBM installation is seeking Analyst/Programmers with a good COBOL and commercial/manufacturing background. Opportunity to work on advanced systems, and to receive the best training.

BOLTON COBOL PROGRAMMER
c. £5,000 + BENEFITS
COBOL programmer with 2 years' experience are required for development and maintenance of both batch and on-line applications. Go-ahead IBM installation.

MANCHESTER SYSTEMS ANALYST
to £5,000
Our client operates a large IBM installation under CICS/VS/CICS and is seeking Analysts with 2 or more years' experience. Some programming experience preferred but not essential.

LIVERPOOL SYSTEMS ANALYSTS
to £5,250
Analysts with 3 years' experience on commercial systems are required by our client who is shortly to update to 2900 hardware. Good salaries and prospects.

WARRINGTON COBOL PROGRAMMER
£4,300
Our client requires a young COBOL programmer with over 8 months' experience. Good benefits and guaranteed reviews.

CHESTER COBOL PROGRAMMERS
to £5,500
Young, well educated COBOL programmers with over 2 years' experience on any hardware are required by our major client. Opportunity for development work on a number of applications.

LIVERPOOL PROJECT LEADERS
to £5,000
Project leaders with an in-depth experience are required by our client. Major developments in a large and advanced installation.

LIVERPOOL SENIOR SYSTEMS ANALYST
c. £7,000
Our client is seeking Senior Analysts with a wide commercial background. Excellent prospects and benefits with this major company.

WARRINGTON ANALYST/PROGRAMMER
£5,500
An Analyst/Programmer with good commercial experience and a sound COBOL background is required by our client for major on-line developments on 2900 hardware.

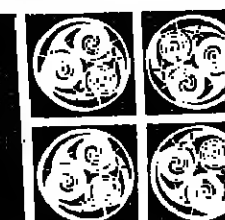
LIVERPOOL PLI PROGRAMMER
to £4,500 + BENEFITS
Large, Liverpool based organisation requires young, bright PLI programmer to work on interactive financial applications with database involvement. Excellent opportunity for staff with sound 2 years' experience.

Phone STEVE SYKES on LEEDS 444185 (daytime) or on LEEDS 652417 (evenings or weekends), or write with brief details (no stamp required) to Lorian Computer Services, FREE POST, Leeds LS7 3YY.

"If you're considering a move then you should contact Lorien first"

LORIEN COMPUTER SERVICES Recruitment Consultants

OCS House,
Servia Road, Leeds LS7 1NJ
Telephone 0532 444185
* (24 hour Ansaphone service)



Holland, Germany, Ireland, Belgium, Switzerland and the U.K.

We have a first-class selection of permanent/contract opportunities throughout Europe.

Based in convenient locations throughout the above countries are a choice group of Blue Chip Companies offering excellent salaries and relocation +.

Individuals with good expertise in any of the following areas should apply immediately

- REAL-TIME COMPUTER SYSTEMS
- COMPUTER COMMUNICATIONS
- SCIENTIFIC/TECHNICAL
- COMMERCIAL BUSINESS SYSTEMS
- BASIC SOFTWARE DEVELOPMENT

For further details concerning these appointments please contact Eddie Howard

COBOL 18 months +

£ to 8,000.

HOME COUNTRIES

Our Client has been making headlines again with the successful launch of their new series 32 Bit Mini. As a leading computer manufacturer they are always seeking new talent and in this instance they require someone with good knowledge of a JCL or time sharing. It is important that candidates are self motivated and well presented as client contact is inevitable.

For further details please contact CW239.

REAL-TIME PROGRAMMERS

UK & OVERSEAS ● **DEPENDENT ON LOCATION**
Take advantage of our position as one of the leading recruitment specialists in the field of scientific programming. Today, more than ever, there is a demand for highly skilled personnel with the ability to tackle wide ranging projects in the design and development of scientific computer systems. If you hold a degree in a scientific discipline or have relevant practical experience of real-time mini computer systems, using either ASSEMBLER, BASIC+, MACRO 11, CORAL or FORTRAN, then give us a ring quoting ref. CW240.

Edmund Howard & Partners

6 BRIGHTON ROAD, SURREY, ENGLAND. TEL: 01-389 9183

Computer Personnel Consultants

01-389 9183

NEW IBM 4300 Plus NEW IBM 370 Equals NEW OPPORTUNITIES IN SLOUGH Basic salaries from £6000-£9000

COBOL programmers*
Systems programmer*
Senior operators (non shift)*
DOS, CICS, DL/I*

FREE CAMERA

Cut this out and take it with you to your interview

Whether you join the company or not, we will exchange it for a brand new electronic Auto exposure Voigtlander V110 EL camera plus electronic flash. No strings. Just perfect pictures and a chance to learn more about these fine opportunities.

Career prospects are excellent and new VDU based systems mean plenty of job interest whatever your specialisation.

These openings are at all levels and all carry very good salaries. For example a COBOL programmer with sound DOS, CICS and DL/I experience and capable of leading a small team could command £9000 p.a.

A senior operator working single shifts would start negotiating from £6000 p.a. If you are really good and know IBM inside out our client will pay what it takes to attract you.

We are also seeking a good systems programmer prepared to assist with commercial applications. Again, you can virtually name your price if you have solid DOS, CICS and DL/I experience.

Whatever your skills and level of experience you should talk to us about the range of opportunities available.

The company is an internationally known name in quality consumer durables and offers secure employment, above average salaries and excellent working conditions.

To find out more, please call Laura Elliott or write to her at:

Castle Computer Services Limited
271 High Street, Berkhamsted, Herts. HP4 1BW. Phone: (04427) 73151

SOFTWARE DESIGNERS

Do you have two to three years' experience designing systems with microprocessors or minicomputers? If so, there is an opening for you in our active, expanding Research & Development Department.

We currently have vacancies for two Software Designers to work on microprocessor-based designs and take responsibility for their software development.

The Department is active in a variety of fields including Research, Electronics, Computing and Precision Engineering, giving the successful applicants the opportunity to display their skills solving a wide variety of problems.

Applicants should have a suitable degree or other equivalent qualification, and have worked with at least two of the following systems: PDP11/LSI11, RT11, RSX11, IAS, M6800, Z80/8080. An understanding of computer hardware would be a distinct advantage.

The Department is currently based in London EC1 but will be able to offer the opportunity to work to the west of London in the near future. An excellent benefits package is offered, including a non-contributory pension scheme, free life assurance, free staff restaurant, and relocation assistance.

The appointments would be financially attractive to those currently earning around 6.5K.

Please write to: **M. H. Boorman, 2 Charterhouse Street, London EC1**, for an application form, giving a brief description of your career, and a telephone number where you can be contacted.

A change
for the
better.

Ever wanted
to start all over again?
We can help you
find a new life and a
new lifestyle.
Call Dennis Clay,
on 01-680 1955.

COBOL PROGRAMMERS

London & S. England
Salaries to £7,000

MACROLOGIC
(recruitment consultants)
01-278 5634

£4000 - £7000+
North & Midlands
Analysts & Programmers
061-432-4184
(Excludes agencies & agencies)
Sampson Staff

The University of Manchester
Institute of Science and Technology

UMIST CHAIR IN SOFTWARE ENGINEERING OR IN APPLIED MICROELECTRONICS

Applicants are invited for a new Chair to be created either in the Department of Computer Science (Software Engineering) or in the Department of Electrical Engineering and Electronics (Applied Microelectronics). The Chair will be the established position of UMIST in the application of computers and programmable microelectronic components.

Applicants should have made significant contributions in areas such as:

- The Application of microprocessors in Electronic Engineering in Data Processing
- System Development Environment
- Computer Assisted Design
- Design and Testing of Digital Systems in Microelectronic Components
- Distributed Computing
- Programming Languages
- Interpretive Machines
- Formal Design Methodology
- System Reliability
- Robotics
- Computer Theory
- Data Networks

Both Departments have extensive facilities to support research and teaching of established B.Sc. and M.Sc. courses and are jointly developing a new M.Sc. course "Microprocessor Engineering & Digital Electronics". The Microprocessor Engineering Unit within the Department of Electrical Engineering and Electronics houses several microprocessor development systems and other support facilities including the CYBA-M multi-microprocessor system. The Department of Computer Science contains several facilities including a PDP 11/34 which supports UNIX, MicroAda and MicroCobol and the development environment for CYBA-M, plus a teaching laboratory based upon six separate PDP 11/03 systems. Batch and Interactive Computing facilities are provided on the 1908A/7600 and CYBER 72 systems at UMCC. In addition there is the DEC PDP 11 system connected to the SRC ICF network.

Each department has links to the UMIST Microelectronics Applications Unit which has been established to provide a medium for technology transfer to industry based upon a consultancy, contract, prototype development and courses for the re-training of industrial personnel. Applicants should be received as soon as possible after the appearance of this advertisement. Salary will be in the Professional range with a minimum of £10,000 from 1st October, 1979, with a further rate of living increase to be negotiated to operate from 1st October, 1979.

Further particulars and application forms may be obtained from the Registrar, UMIST, P.O. Box 88, Manchester M60 1QD, by quoting reference EEE/108/DC. Enquiries may be made to the Registrar, or to Professor D. Aspinall in the Department of Computer Science or Professor H. C. A. Jenkins in the Department of Electrical Engineering and Electronics.



Our client, part of an International Pharmaceutical Group, is engaged in the research, development, manufacturing and marketing of a wide range of ethical and allied products.

The delivery of an IBM 4341 is fixed for October next year to replace their existing IBM 370/125. Major developments are underway currently in production planning and control systems utilising DL1 and CICS. A committed programme of development will commence early next year with fully integrated DB/DC facilities. Their current EDP team of 37 staff is planned to expand accordingly.

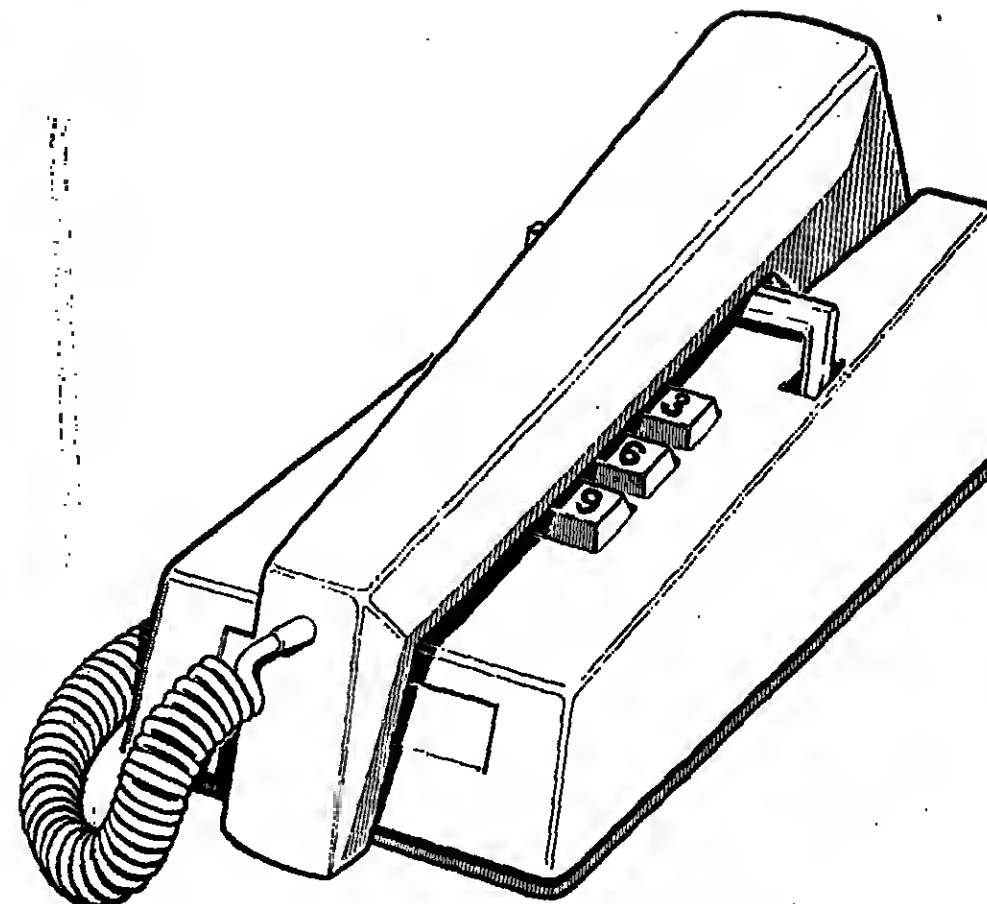
They currently require programmers or analyst programmers with good COBOL programming experience. Machine experience is unimportant. Training will be given in IBM assembler and CICS/DL1.

This is a super company, offering free lunches (comparable to most West End restaurants) and mid-morning snacks, an excellent 6 months sick pay scheme together with long term incapacity benefits. Free BUPA and personal accident schemes with a contributory pension scheme. Salary negotiable up to £8,500 with a review before the end of the year.

There is plenty of parking space and the Company is 5-10 mins walk from Piccadilly and Central Line Stations.

CONTACT:
BOBBIE McCORMICK, Director
on 01-603 7335

Mail this to: ACT NOW
I.P. FREEPOST, LONDON W6 8BT
FULL NAME _____
ADDRESS _____
HOME TEL. _____
OFFICE _____



SOFTWARE SUPPORT PROGRAMMERS

THE COMPANY

ITT the International Telephone and Telegraph corporation was founded in 1920 and is now one of the world's largest businesses. ITT is a diversified, multi-product company with manufacturing and/or sales activities in 86 countries.

To maintain its current leadership in many areas of telecommunications, electronics, and other fields ITT needs specialised units with the capability to meet the rapidly changing demands of the telecommunications market thus IDEC - The International Data Engineering Centre.

THE LOCATION

These appointments are based in modern offices at Potters Bar which is in the middle of delightful Hertfordshire countryside. It is easily commutable from London and surrounding areas.

THE VACANCIES

IDEC are looking for people to join their expanding team of professional programmers, which is currently developing software aids for testing multiprocessor systems using the INTEL 8080, 8085 and the new 8086 microprocessors. The software is then simulated on an IBM 370/158.

THE REQUIREMENTS

They would like to talk to you, if you have two years' programming experience gained in a mini or micro environment, and are interested in developing future technology. As the Software is developed on an IBM machine, your knowledge of any high level language coupled with the desire to move into the technical field could be of interest. This experience need not necessarily have been gained in an IBM installation, although it would be useful.

THE FUTURE

Horizons are only limited by imagination. ITT has a record of past innovation and achievement; present investment in research and development will help fashion the shape of things to come.

IDEC
A Development Centre for
ITT Business Systems

MICRO-PROCESSING FOR TOMORROWS WORLD IS WITH ITT TODAY

This is what the future in microprocessing could mean for you!

- * Starting salaries to £8000.
- * At least 23 DAYS annual leave.
- * Discounts on many ITT products, such as television sets, stereophonic and audio equipment.
- * Flexible working hours.
- * Luncheon Vouchers.
- * Relocation expenses.
- * Superb sports and social club facilities.
- * Modern offices set in the countryside.

The future begins now, so why not pick up the phone and call Basil Pearce on 01-439 7871 for further details. If this is not convenient why not cut out the phone and post it.

Ref: BP 25/1

PLEASE SEND ME FURTHER DETAILS ABOUT THE FUTURE WITH ITT

Name _____

Address _____

Tel. No. _____

KNIGHT PROGRAMMING SUPPORT LIMITED

MANCHESTER

143/4 ROYAL EXCHANGE BUILDINGS

CONTRACTS

IBM 370 OS ASSEMBLER TSO PROGRAMMERS

Required for our Northern client.

c£230

UNIVAC 1108 PROGRAMMERS

Required by our North West and Midlands clients. Varied applications, general, commercial financial. Contracts 3-6 months+.

c£220+

PDP11 RSX11M CORAL 66 PROGRAMMER/DESIGNERS

Required for our Northern client. Interesting long term contracts.

c£NEG

IBM 370 COBOL/CICS

For our Midlands client.

c£230

DATABASE ADMINISTRATOR

with IDMS expertise required by our Midlands client.

c£NEG

OS/VS1 COBOL PROGRAMMERS

Required by our Midlands client. Various commercial applications.

c£220

2903/4 COBOL PROGRAMMERS

Required to work in the North East. Contract of 3-6 months in duration.

c£NEG

LARGE 2900's S.3 PROGRAMMERS

Interesting contracts Northern location.

c£NEG

MARK IV PROGRAMMERS

Required for Northern client.

c£220

CICS/PL1/OOC/VS/PROGRAMMERS

Required by our Midlands clients. Various applications.

c£230

SINGER SYSTEM 10 ASSEMBLER PROGRAMMERS

Required for Scotland and the North East.

c£220

OOS/VS COBOL PROGRAMMERS

required Midlands.

c£220+

PDPII RSX11M MACRO II ASSEMBLER SYSTEMS DESIGNER

for our Midlands client.

c£300

For details of these and other contracts please contact Judy Lees/Lynn Barton on 061-833 8341/6 (24 HRS.)

CURRENT VACANCIES INCLUDE:

PROGRAMMERS

IRELAND

to £8500

Our client require programmers with PDP BASIC or DIBOL experiences to work in installations in Southern Ireland. Relocation expenses. Ref. 115B.

PROGRAMMERS

NORTH

to £5712

Programmers with COBOL experience are required to work on large 2900's. Productivity payment/relocation expenses. Ref. 1071.

PROGRAMMERS

NORTH WEST

c£5300

Subsidised mortgage scheme offer: COBOL or ASSEMBLER programmers required to work on advanced IBM equipment. Ref. 1139.

ANALYST PROGRAMMER

LANCS

Our client require Analyst Programmers ideally with IBM/COBOL experience to work in an expanding installation. Excellent career prospects. Ref. 1065.

ANALYST PROGRAMMERS

THE NORTH

£5600

Analyst Programmer with ICL COBOL experience and driving licences are required to service a group of companies in the North. Ref. 115B.

ANALYST PROGRAMMERS

WEST YOKS

c£5400

Our client require a working knowledge of design and analysis or a desire to get into systems. COBOL experience required. Ref. 1113.

SYSTEMS ENGINEERS

CLEVELAND

to £7650

Our client require Systems Engineers with experience in process control. DEC knowledge an advantage. Ref. 1161.

SYSTEMS ANALYSTS

NORTH

c£6200

Productivity payment and relocation expenses offered. Our client requires Analysts to work on large ICL 2900's. Ref. 1073.

SYSTEMS ANALYSTS

LANCS

to £7000

Our client a leading expanding installation require Analysts to work on IBM equipment. Relocation expenses offered. Ref. 1166.

SYSTEMS & PROGRAMMING MANAGER

MIDLANDS

c£7000

Our client is in need of a Systems and Programming Manager to work in their ICL installation. Commercial environment/relocation expenses. Ref. 1169.

ANALYST PROGRAMMERS

THE NORTH

to £5600

Analyst Programmers or Programmers with an interest in systems required. ICL PLAN experience ideal. Ref. 1166.

SYSTEMS PROGRAMMER

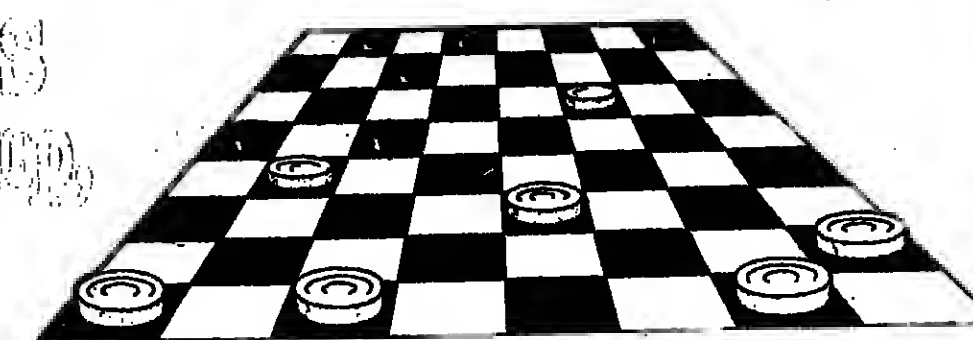
LIVERPOOL

to £6000

Good working knowledge of operating systems and high level languages required. DEC experience an advantage. Ref. 1163.

CONTACT: JOAN JOHNSTONE
061 833 8341 (24 HRS.)

PROGRAMMERS
TECHNICAL SUPPORT
TECHNICAL SUPPORT
TECHNICAL SUPPORT



Your move to Cheshunt and Tesco could be the turning point of your career. For you'll be establishing yourself in the forefront of program development. And there's no more exciting or vital place to be today.

Tesco have got the hardware, the IBM 3032 and all the latest peripherals, and they are making it work in a way that management can understand and use.

You have spent some time in the industry, gaining experience on a variety of commercial projects, and you're ready to

start moving up. You can with Tesco. To start with, you'll be working in a small specialist team. But the department is growing - just like Tesco itself - and opportunities for advancement will be frequent as your skills increase and you feel the need for greater responsibility.

We're looking for programmers at all levels of seniority: show us that your experience justifies it and we'll pay you a **SALARY OF UP TO £7,000 pa.** You will enjoy a subsidised restaurant, Country Club membership, a contributory pension scheme and, where

applicable, re-location expenses to the pleasant environment of Cheshunt and the Lea Valley.

For more information and an application form, contact: Fred Rayers, Computer Services Manager, Tesco Stores Ltd., Tesco House, Delamare Road, Cheshunt, Herts EN8 9SL. Telephone: Waltham Cross 32222. Ext. 3398.

COMPUTER PROFESSIONALS

LOCATIONS SOUTH EAST, ENGLAND

Are you a Computer Professional looking for a rewarding career in sales?

Our Client is an international Computer Manufacturer offering a structured career path for trainees and experienced Sales Executives.

The successful applicants will be working with advanced equipment that enjoys an excellent world-wide reputation.

To give you a recipe for success, our Client will provide:

- ★ Exciting highly competitive products
- ★ Full technical support facilities
- ★ Continuing sales, product and management training
- ★ Realistic and achievable quotas

Here is a rare opportunity to become part of our Client's exciting future and join a professional sales team where you will enjoy the substantial rewards of one of the world's top manufacturers. Ideally, candidates should possess:

SALES EXECUTIVES

- ★ A confident sales personality to accompany a successful track record in selling mini and mainframe computers.
- ★ The qualities and attributes to work in close contact with existing Clients and the ability to identify new prospects.

TRAINEE EXECUTIVES

- ★ A real wish to sell in a professional environment.
- ★ A broad knowledge of commercial and business systems.
- ★ Good commercial skills both oral and written.
- ★ The personal drive and self-motivation necessary to succeed in a sales role.

A Company car, full expenses, plus other big Company benefits apply. So do not miss this chance for an immediate and confidential interview. **CONTACT Simon Lever on 01-835 0671 (24 hour answering service) or 0562 884166 (evenings and weekends).**

London 01-835 0671 3 Mandeville Place, Wigmore Street, London W1M 5LB.
Birmingham 021-238 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY.
Manchester 061-833 0427 Blackfriars House, The Personage, Manchester M3 2JA.

Specialist Computer Recruitment Ltd

Apply in 10

Technical Consultant (Circa £9,000+company car)

We are Tesco Management Services Limited, a newly formed Computer Services company, a wholly owned subsidiary of Tesco Stores Limited.

We require a highly skilled computer professional who will directly contribute to the success of this ambitious young company. Applicants should be men or women with considerable experience of at least one IBM Operating System, and a good knowledge of Assembler and COBOL. People who, as consultants, will provide marketing support and also develop software aids for use on customers' premises.

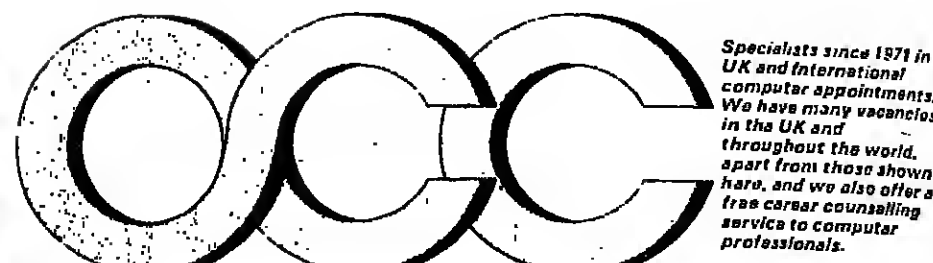
We are looking for a high degree of professionalism plus good communicative skills, and a maturity that comes of experience rather than age. You will have demonstrated that you can cope in a variety of different environments and must have an awareness of the skills required to manage and motivate people.

You must be ambitious, and be prepared to work as part of a small but highly-

motivated team and be prepared to work away from home as required.

There is likely to be considerable U.K. travel and therefore you will need a current driving licence.

Benefits will include a contributory pension scheme, subsidised restaurant, and re-location expenses where applicable. For more information and an application form, contact: Fred Rayers, Tesco Management Services Ltd., New Tesco House, Delamare Road, Chesham, Herts. EN8 9BL. Telephone: Waltham Cross 32222 Ext. 3398.



Hotel Systems London & Overseas

Project Managers to £10,000 p.a.
Team Leaders to £8,500 p.a.
Senior Programmers to £7,000 p.a.

A major UK Software House is rapidly expanding its hotel systems division. There are opportunities for senior staff at their Product Development Centre in West London and for implementation staff for projects in UK, Europe, North America, Far East and Australia. The typical duration of an overseas assignment is six months plus consultancy and sales visits.

Candidates will have extensive experience of mini-computer projects on commercial applications, especially reservation, accounting, point of sale and communication links to specialist terminals.

Project Managers should be able to take technical and financial responsibility and to deal with the top levels of User Management.

In addition to the salary quoted above, the remuneration package includes good travelling expenses and the possibility of a productivity related bonus. Ref: 16B/CW/FS.

Informal Interviews: Our clients will be at our premises on Monday, 25th, and Tuesday, 26th June, 5.30 to 7.30.

To apply for any of the above positions contact Fran Setter or Sarah Hurn on 01-242 9356 (daytime); 01-673 0205 (evenings/weekends)

OCC Computer Personnel Limited
18 Bedford Row
London, WC1R 4EB
Telephone: 01-242 9356



PROGRAMMERS/SYSTEMS ANALYST

Join Data General's new
Software Applications Group

Data General is already firmly established as one of the world's foremost computer companies. Now, as part of our continuing programme to broaden the service to our clients, we are setting up a new Software Applications Group to be based at Hounslow.

We need two experienced programmers and one systems analyst, who will provide the springboard for the further development of the new group... so career prospects will be excellent. Ideally you should have telecommunication or commercial experience on minis, preferably in COBOL or Assembler.

Systems Analyst

You will receive a salary around £8-9,000 (depending on your experience) plus a company car. Demonstrated ability and personal growth could lead to a Project Leader's position in one to two years.

Programmers

You will receive a salary around £6-7,000. Unusually good opportunities for promotion to System Analyst are available within the Data General organisation. This is an excellent 'ground floor' situation with potential for advancement in the next year or two.

Phone or write to Clive Wright at the address below.



Data General Limited, 3rd & 4th Floor, Hounslow House, 724/734 London Road, Hounslow, Middlesex TW3 3PD. Tel: 01-572 7455.

Graduate plus two years?

If you have two years' computing experience now is the time to acquire some microprocessor expertise.

At Marconi Avionics we provide training in design techniques and CORAL. At plants in Borehamwood, Welwyn Garden City and Radlett, all in Hertfordshire, we are writing software for TEXAS, MOTOROLA and INTERSIL microprocessors and we need programmers and engineers for several small projects.

So if you are a graduate with two years' programming

or hardware experience and are interested in working with microprocessors please ring Chris Hill on 01-953 2030 ext. 3449. Alternatively write to him at Marconi Avionics Limited, Elstree Way, Borehamwood, Hertfordshire. Please quote reference MA79105. These posts are open to both men and women.



CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Miss David Abbey for further details on 01-261 8015.

ab improve your career!

Our career planning advice HAS to be right — it comes from our top applicants and the people who hire them! It also comes from the people who can't help — the ones that got it wrong. When we pick our jobs, we look for the training, the exposure, the rewards and the options that YOU are going to need as your career progresses. The following jobs are all 'CAREER BUILDERS.'

TRAINEE APPLICATIONS CONSULTANT

Richmond Start £5000-£5500
This UK services company (American parents) has a well-established, highly profitable operation based in Richmond and prefers to groom its own consultants. The 3-phase training program extends over 2 years, including formal courses and practical experience in applications, languages, packages, database systems, communications and personal skills. After initial training you will work on your own projects, with your own customer base, earning bonuses geared to your own, and the company's performance. As you progress you will receive a car allowance — or a company leased car if you prefer — and promotion to consultant status after 2 years. For keen young professionals who have made a start in commercial programming or systems, this is one of the finest apprenticeships in the industry. Ref. CA 765

SYSTEMS CONSULTANT

Wembley Min. £7,500 + car
Small Systems Manufacturer (stand-alone and distributed applications) offers two customer support roles — mainly analysis but some programming. Interesting projects — reservations, warehouse, POS, etc. Ref. CA 710

MICRO FIELD ENGINEER

280, 8080, 890 in U.K. and Europe

Home Counties North Package c.£6,000 + car
Newly established systems company (subsidiary of very successful software house) is offering exciting opportunities to ambitious engineers. All the leading microprocessors are featured in the wide range of standard and custom designed computer systems built and marketed by this compact, dynamic company, based North of London. If you are seeking to gain experience on the above micros, enjoy travel and meeting people — have good electronics/computer background then call today — but hurry! Ref. EK 2174

COMMISSIONING ENGINEERS

North London c.£5,000 start
New division of important computer systems house have opportunity for a young, ambitious test/commissioning engineer to help build up the operation. You will gain experience on a wide variety of micro-based computer products in a role that leads to technical consultant or customer support. If you have an electronics background, this is a chance to apply and develop it in a really stimulating environment. Ref. EK 2175

SMALL IBM SYSTEMS

Kingston £4 1/2 - £8k + car + bonus
A successful systems house with a queue of new customers is eager to meet you if you have RPG 2 or BASIC with commercial applications experience. Bonus scheme, generous expenses, salary review twice yearly. From programmer to Project Leader you will enjoy working with this lively young team. Right by the station, own car park + local pub with the best food in Kingston. Phone us quickly for this one! 'If you have two years' good experience, on small machines, they are willing to teach you RPG2. Ref. CC307

SYSTEMS ANALYST

Morden £7,500 + car scheme
Be second-in-command to one of the best managers we know. Are you a Systems Analyst, articulate and experienced, perhaps with a programming background? (TOTAL database experience would be a definite 'plus'). You will develop a new on-line accounting and enquiry suite for this progressive retail company. Interest-free car loan, good holidays, huge discounts on goods for your home (beat the VAT increases!). Short trips to the Cotswolds: Floxtime. A really terrific career opportunity. Ref. CC 325

SALES EXECUTIVES

£17,000 + Car
Our clients, one of the New Leaders in the minicomputer field, who during 1978: Broke the \$100M barrier Doubled their turnover Doubled their customer base Built 2 major facilities —are offering exciting opportunities in the South to ambitious Sales Executives.

If you need:

Basic Salary c£7,000
Earnings Guarantee
Realistic Quotas
Generous commission (on quota £17,000)
2 litre car
Comprehensive training
Unrivalled management opportunities
Then call today
Ref: CS 1146

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+ Generous commission + car
Ref. CS 1153

ab executive (kingston) ltd 01-549 6441

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telephone: 01-637 9611
Suite 201/6 Albany House
324 Regent Street
London W1R 5AA

The Company

A consultancy whose totally professional approach has earned them one of the highest reputations in the computer services industry.

Base salary £6½k Earnings £15k

Commission paid monthly
Guarantee period
No upper earnings limit
Company car scheme

ATTENTION SALES AND SALES SUPPORT PROFESSIONALS

Person

A gregarious personality with a good current knowledge of the computer industry, organisation structures and applications, plus a background in systems, programming, consultancy or management.

Contact Faye Ogilvie
or Tony McGrath

Position

Reporting to the Marketing Manager, you will be responsible for account sales, developing existing clients and further expanding the already broad base of business. This involves travel to client sites so mobility is essential.

£10k+Appointments £10k+Appointments £10k+Appointments

MYRIAD

INTERNATIONAL PRODUCT CONSULTANTS

FINANCE
MANUFACTURING

RETAIL
COMMUNICATIONS

BASED S.W. LONDON
WORLD-WIDE TRAVEL

TOTAL CIRCA £14,000
PLUS EXPENSES

Four outstanding persons are required to form a new department within a leading, multi-national organisation based in S.W. London. Operating as an integral unit, the persons appointed will be responsible for implementing a five year strategic and operational plan for the development and expansion of major computing facilities in the four business areas specified above. Each Consultant will specialise in one of these areas to establish and advise marketing/sales teams throughout the world, ensuring efficient policies are being pursued. They will possess a comprehensive knowledge of potential applications areas in order to identify and exploit future markets to which modern computer technology can most effectively be applied.

Candidates should offer

- * IN-DEPTH EXPERIENCE OF ONE BUSINESS AREA
- * ENTHUSIASM, CONFIDENCE AND MATURITY
- * COMPUTER SYSTEMS BACKGROUND
- * THE ABILITY TO COMMUNICATE EFFECTIVELY WITH SENIOR MANAGEMENT

The Company is able to offer exciting career opportunities in a very rewarding environment, coupled with the security of a major U.K. organisation. Salaries are negotiable and will not be a problem for applicants with the required skills.

REF: S2/2106

MYRIAD APPOINTMENTS LIMITED
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International
Management &
Personnel Consultants
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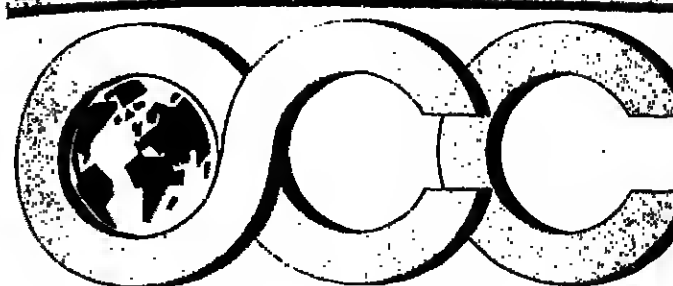
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THE BENEFITS: The higher than average salaries reflect the prominence which our client places in the acquisition of these key personnel. Additionally, extensive benefits include life and disability insurance, pension and medical plans, overseas allowances and liberal mileage allowances.

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The post involves completing feasibility studies, producing cost data to support capital expenditure and maintaining all in-house computer equipment required for new or existing systems. You will also be responsible for supervising and developing subordinate staff.

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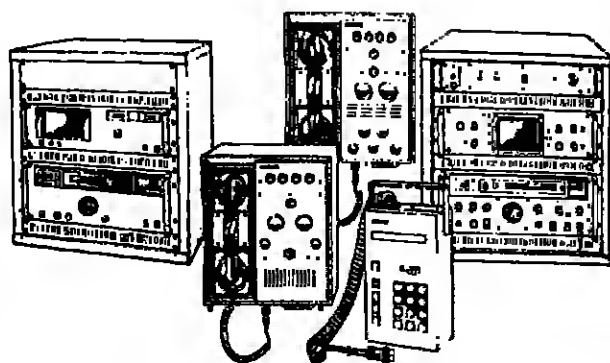
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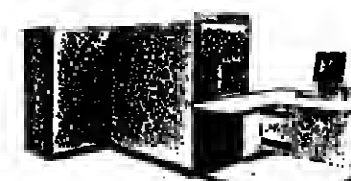
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NCR 8200 experience with IBCS1 - at least a year, ideally 2 years - is essential. We'd prefer 8250, of course. Also important: supervisory and computer scheduling/control experience. However, you should be prepared to act as a VDU Operator yourself. Age: probably 25-30.

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MIDLANDS APPOINTMENTS



Lively and progressive scene for all DPeople

By Mike Wood

THE Midlands offers a wealth of variety of industries, professions, trades and crafts. Perhaps by virtue of this it can rightly be described as the barometer of the nation's industrial climate. Scrutiny of the Midlands scene can easily bring to light the national trends in terms of development, requirements and problems.

The data processing sphere in this region continues to be a lively and progressive environment for most users, suppliers and support organisations concerned with computing.

Perhaps the people most enjoying the current situation are the more established, proficient and presentable members of DP staff themselves. Surely at no time in history can such a body of people have had so much choice of environment and possibilities for enhancement of incomes and skills, short of being a marriage broker during the reign of Henry VIII.

There are provisos, of course. Programmers need to have a good commercial language background. Analysts and analysts/programmers need to have had actual involvement in the design and/or implementation of financial systems. Skills in the technical areas of software programming or scientific applications tend to be as highly valued, but obviously by fewer organisations. Such is the demand for established but not too senior staff that it is not uncommon to see a programmer increase his or her income by up to £2,000 in less than two years.

Indeed, one recent local study has shown an increase in starting salaries of 17% in the last three months compared with 15% for the previous six months. So the situation for the

middle range development staff remains extremely buoyant. In the majority of cases financial motivation - while never being less than an inducement - is by no means the primary consideration. A desire to be involved, extended and appreciated, allied with identifying an established career structure he or she can progress through, best describes the most attractive proposition to these people.

What of other areas of staff? Senior analysts, systems designers, DPMs and operators continue to enjoy improved rewards for their efforts but lack the opportunity of movement that the middle range people are afforded. People reaching senior positions in data processing stay, both in a senior position and in data processing. Best illustrating this bottleneck is the annual survey showing the average age of the occupants of each post. Each year the average age of the DPM increases by one!

Operations staff still have the age-old problem: half the operators are frustrated in their attempts to get to grips with Cobol coding sheets and the like, while

In this survey of the Midlands recruitment scene, Mike Wood, senior consultant with Computer Personnel Consultants, of Birmingham, says that the area continues to enjoy the up and

the other half hungrily await the expiration of their operations manager (having already measured the size of his shoes).

A word about operators: I have seen in recent weeks quite a number of operators who, in terms of general presentability, would put many senior staff to shame - willing to relocate and asking realistic salaries because they have not been sent on training courses by their existing employers.

In general terms, however, employees are improving their ability to sell themselves to applicants. Disappearing are the old attitudes of "take it or leave it". If an applicant appears to be suitable, every effort is made to obtain his or her services. Suitability means much more than just technical skills. Personality is at least as important as experience and general competence.

Applicants are obviously

looking to improving themselves. As has already been stated, it is unlikely to be purely financial. Indeed, with so many staff enjoying reviews, pensions and fringe benefits, it takes a great deal more than a slightly increased salary to prise people away from the devil they know to an identical devil but in a different environment.

Illustrating this point is the recruitment performance of companies whose hardware and/or applications developments lag behind the general level. Regardless of salary, their inability to procure staff becomes acute. As soon as their development plans are implemented, they once again become an area of interest.

Perhaps the area of greatest influence is that of software houses. Variety of application, a high degree of involvement and responsibility, experience of different areas of equipment,

suffer the downs of the industry as a whole. But where it may well differ from other regions is in its ability to attract the less parochial people from all parts of the country.

less sedentary positions and good financial reward all go to make a reputable software house, of which the Midlands has a good share, a very attractive proposition to many people researching the market.

Traditional bureaux through to OEM turnkey operations are all reaping the rewards of micro technology and software development. Consequently, they are hungry for established, competent and presentable staff capable of being an investment bringing the speediest return. So prolific must be the prospective user base in the Midlands area for the software houses that many still operate without any recognised sales force - or perhaps it's cheaper that way?

The software house does not suit everybody and users are still able to retain staff who are not attracted by or are not suited to the software house environ-

ment. However, DP people have a history of being very loyal to their profession rather than their employer. It is easier for them to identify their career with a software house which relies solely on their efforts rather than as part of a cog in a complex mechanism.

Despite the efforts I have mentioned being made by commercial and industrial organisations to procure and retain staff, there exists a disturbing vacuum of personnel in the middle range. While accepting the probability that high level languages and more sophisticated operating systems will eventually produce a radical change to the existing scene, the problem exists now and will become more intense over the next few years.

There appears to be only one solution to this problem. Employers must be afforded the resources to take a greater induction of trainees. The Midlands has an abundance of institutions producing a variety of "qualified trainees". Computer science degree holders are currently favourites with employers and have relatively little problem in slotting into a suitable position by virtue

of their environmental experience during placing periods. For the rest, though, it remains a more difficult struggle.

Many DPMs have remarked to me of their admiration for 30-year-old engineers and the like who have made a conscious and committed decision to transfer to computing via, say, a five-month TOPS course but are unable to pursue matters further because of the uneconomic situation of being non-productive in an installation for a period of months.

Surely each employer of reasonable size must take it upon himself to bring pressure to bear upon the powers-that-be to redress this situation. Governments have supported and sponsored the retraining of individuals in a most laudable manner, but now surely is the time for a more strategic thinking from government, perhaps in terms of increased grants to employers recruiting trainees, or from employers themselves to endure a short period of pain but eventually avoid the impending drought of available competent staff.

To conclude, the Midlands continues to enjoy the ups and suffer the downs experienced by the industry as a whole. Where it differs, perhaps, from other regions is in its ability to attract the less parochial people from all parts of the country. Variety - in terms of professional and social activities, ease of travel, busy but not hectic atmosphere and relatively inexpensive housing (particularly compared with the south-east) - all add up to an environment which native Midlanders enjoy and so, if might appear, do many emigrés from other parts of this micro-empire of ours.

WESLEYAN & GENERAL ASSURANCE SOCIETY COBOL PROGRAMMERS BIRMINGHAM

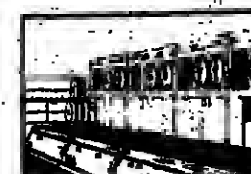
Vacancies exist for computer programmers, in a city centre insurance office male/female, with at least 2 years Cobol experience, preferably in a commercial environment, who wish to further their career in the systems area.

Salary is negotiable, subject to experience, with a full range of fringe benefits including, concessionary mortgage facilities, non-contributory pension fund, and flexible working hours.

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We require a computer operations supervisor (male/female) to take responsibility for a computer department currently consisting of five employees. The equipment installed comprises of a mini-computer and two visible record computers. Main duties will include the scheduling of work flow and supervision of department, liaison with other departments and involvement with future growth and implementation of new systems.

Applicants should have a pleasant personality and be able to communicate at all levels. Previous relevant experience is essential. Salary to be negotiated, four weeks' holiday per year, pension scheme, subsidised meals, etc.

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The person appointed would be required to design and implement user-oriented packages and interfaces of a variety of different mainframes.

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Salary will be dependent on age, qualifications and experience, probably in the range £4000-£5500 p.a.

Apply to:
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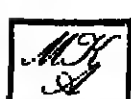
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Ring David Abbey for further details on 01-261 8016.

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Application forms to be returned by 20th June, 1979, can be obtained with further particulars from the Principal, Coventry Technical College, 60a, Coventry, CV1 3DD, Telephone Coventry 87221, Ext. 270.

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School of Mathematics Computing & Statistics

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(Full-time or Part-time)

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Please write for an application form, quoting the appropriate reference number to: Staff Office, Portsmouth Polytechnic, Alexandra House, Museum Road, Portsmouth, or by telephoning 27881 Ext. 317.

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Application forms are obtainable from the Chief Personnel Officer, Civic Centre, Millgate, Wigan, Tel. Wigan 44891 ext. 110 to whom all completed applications must be returned no later than 8th July, 1979.

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We require PL/1 DOS/VS programmers, knowledge of IDMS an advantage. Six-month contracts in Kent. Start 2nd July.

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to be responsible for the design and development of hardware from specification through to acceptance and implementation. This will involve the interface of non-CTL equipment to CTL computers with the emphasis on the use of micro-processors.

Candidates, probably mid 20's, will have a Degree/HNC and 2 years' relevant experience in a computer or related industry. Digital experience highly desirable.

Both posts, open to men and women, are based in Hemel Hempstead. Salaries are negotiable according to experience and include excellent company benefits. Interested? Then please write or telephone for further details/application form to: Jim Parle, Personnel Officer, Computer Technology Ltd., Eaton Road, Hemel Hempstead, Herts HP2 7EQ. Tel: (0442) 3272.

CTL

The British Computer Systems and Software Company

Programmers, Analyst Programmers, Senior Analyst Programmers

**up to £8K.
What's in a Name?**

* A COMPANY that can offer an unrivalled range of work, mini computer, micro computer, application packages, standard software, compilers, operating systems, techniques and specialisms.

* FUTURE PROSPECTS that include progress into project or line management, or further development on the technical side, in a stimulating high-technology manufacturing environment.

* THE REWARDS include very competitive salaries, a wide range of major company benefits and incentives to an attractive part of the Home Counties.

* CANDIDATES should send latest but comprehensive career details to:-

Monsie, Pinkney, Keith Gibbs & Co. (Ref.: J.V.), 35 Belmont Road, Uxbridge, Middx. UB8 1RH.

* Since applications, in this instance, will be forwarded direct to our client, please list in a covering letter any companies you don't wish to approach.

CITY AND GUILDS OF LONDON INSTITUTE SYSTEMS ANALYST

SALARY UP TO £7,500

The Institute is an independent, self-financing body and our main business is the provision of schemes and examinations of a technical and vocational nature and a corresponding range of tests leading to skill qualifications. We are developing systems connected with our examination procedures using a PDP 11/34 operating under RSX11M. Programming is being carried out in BASIC+2 and MACRO II.

We are looking for a Systems Analyst to work on the above systems; he/she should have at least 18 months' experience on PDP machines (some of which could have been spent in programming).

Other systems are being developed using a bureau based IBM 3032 under OS/MVS and there may be opportunities to work on these systems at a later date.

We provide a friendly, relaxed atmosphere and pleasant working conditions. Benefits include:

Generously subsidised restaurant
Fees and coffee
On-call payments (where applicable)
Flexibility of working hours
18 days (+ 8 Institute days) leave — pro rata 1st year of service
50% BUPA scheme
1st class pension scheme

If you would like any further information telephone Mike Barker, on 01-278 2488. Application forms may be obtained from the Personnel Department, 46 Brittenia Street, London WC1X 8RQ.

THE HATFIELD
POLYTECHNIC

SENIOR LECTURER IN COMPUTER SCIENCE

Applications are invited from people with an appropriate degree wishing to teach at graduate and post graduate level in one or more of the following areas:
Microprocessors, real-time systems, systems software.

Salary Scale: Senior Lecturer £6081-£7086 (ban) — £7572 (under review) + £150 local weighting.

Internal enquiries by telephone to Mr. J. Davis, Computer Science, extension 330.

Application form and further details available from the Staffing Office, The Hatfield Polytechnic, P.O. Box 100, Hatfield, Herts or telephone Hatfield 66100 extension 300.

Closing date: 8 July.
Please quote reference: 243.

EDINBURGH REGIONAL
COMPUTING CENTRE
SOFTWARE SERVICES
GROUP

The Centre has a vacancy in the Software Services Group for a

COMPUTING OFFICER

The post will involve working as a member of a team which is developing and supporting a number of complex, and their related software environments, on ICL 2800 series machines, using the Edinburgh Multi-Access System and the ICL VME/B and VME/C operating systems.

Applications are invited from graduates (or local area students) with some computing experience. The appointment, which is for three years in the first instance, will be on the Assistant Computing Officer scale, which is £3775-£5000 from 1st October 1979, with Superannuation under USS.

For further details and an Application Form, contact The Secretary, University of Edinburgh, The Old College, South Bridge, Edinburgh EH8 9JL (quoting reference 7013), to whom completed forms should be returned by 12th July 1979.

THE UNIVERSITY
OF MANCHESTER

SENIOR LECTURER IN COMPUTER ENGINEERING IN THE DEPARTMENT OF COMPUTER SCIENCE

Applications are invited for the post which is available immediately. Candidates should have a good first degree and preferably a higher degree in Electronic Engineering or some related discipline and also considerable experience in one or more of the following fields: Integrated Circuit Design, Computer Aided Design of circuits or systems, Microprocessor Design, Data electronic techniques, Memory devices or systems, Interconnection techniques, High density packaging and cooling of electronic systems. Preference will be given to candidates who wish to pursue research into aspects of Semiconductor Electronics relating to computers and who wish to advise and cooperate with others designing and building computer type instrumentation and computer systems both large and small. The candidates will also be expected to teach undergraduate and postgraduate students so the ability to lecture is essential. The salary range will be within the range GS 13/2-15/0, 087 p.a. Further particulars and application form (returnable by June 28th) from the Registrar, The University, Manchester M13 9PL. Quote ref: 118/75/CW.

Mid-West USA Banking

This prestigious Banking corporation is situated at the heart of the Great Lakes amidst what must be described as breathtaking rural beauty. Their D.P. department comprises IBM 370/158, 168, 3031 + 3033 operating under OS MVS, IMS/VS.

To meet their planned expansion goals our client wishes to recruit 20 British IMS or other T.P. specialists with Database and COBOL backgrounds. In keeping with their high standards the client insists on an elevated level of competence accompanied by not less than 3 years relevant expertise.

You will be offered an initial contract of at least 1 year's duration during which time you will receive benefits commensurate with a prestigious banking organisation. These benefits include Blue Shield, Blue Cross medical insurance, paid return fares at start and mid project, initial paid accommodation etc. Interviews will be held in London within the next month and offers made within 14 days. You will be discussing at a salary range around:

\$30K

Comparable opportunities coast-to-coast



Phone: 01-491 4636

Avon House, 360 Oxford St., London. W1N 9HA.

201 East 42nd St New York N.Y. 10017 USA



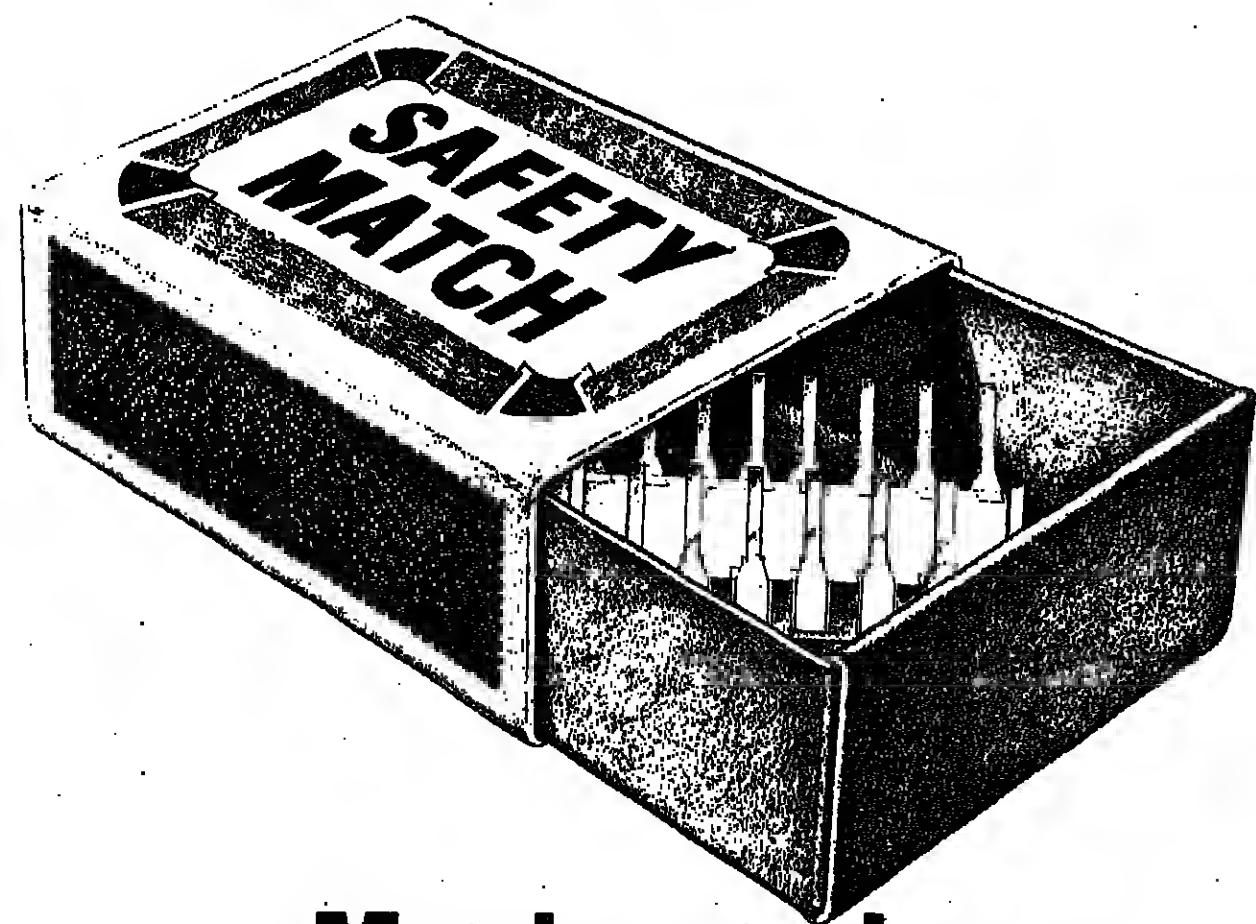
SENIOR PROGRAMMER Up to £6,000

A vacancy for a Senior Programmer has arisen with E. Gomme Ltd., who design and manufacture G-Plan furniture.

The position involves membership of a small team writing application programs in PL/1 for both batch and T.P. (SHADOW II) systems. Program development is done on-line using SHADOW/COYA. The successful applicant will be encouraged to develop system programming expertise.

The installation is A258K IBM 370/125 with 3330 disks, tape and VDUs; and further expansion is planned. Applicants should preferably have at least three years' experience in PL/1, RPGII, SHADOW II or System programming experience would be an advantage. The company is a first-class employer and will, where appropriate, assist with removal expenses.

Write to:
Company Personnel Manager,
E. GOMME LIMITED
Spring Gardens, High Wycombe, Bucks.



Match up to the challenge of microprocessing and we'll set your career alight

Bring us a relevant degree supported by a couple of years in any area of computing, hardware or software (with emphasis on technological applications); prove to us that you can make a real contribution to technological development in a front-line situation, and we'll turn a luke-warm career into a very hot prospect.

We'll give you first-class training in the most advanced design techniques using CORAL, and fire your enthusiasm by giving you ever-increasing responsibility in major projects involving state-of-the-art microprocessing devices from the world's leading manufacturers.

Employing sophisticated components like Motorola 6800, Texas 9900 and Intersil 6100 both singly and in networks on a wide range of defence and radar applications, you'll be given every opportunity to develop your professionalism and pioneer new

technology in an environment in which original thought and quality are all important.

With new data processing techniques being introduced almost by the minute, no ambitious man or woman can afford to be left out in the cold. Your place is at the forefront of microprocessing innovation, and Marconi Avionics can put you there.

For full details, please contact Chris Hill at Marconi Avionics Limited, FREEPOST, Elstree Way, Borehamwood, Herts WD6 1BR. Telephone 01-953 2030 ext. 3449. Please quote reference MA 79090.

MARCONI AVIONICS
A GEC-Marconi Electronics Company

Operator/Programmer

We require a computer operator with knowledge of programming in FORTRAN or BASIC to be responsible for running, maintaining and developing a number of management and accounting programmes on a Harris 5123 Computer now being installed.

Previous commercial experience is not essential.

A salary of £4,000 per annum is envisaged.

Apply in writing giving details of age and experience to:-

W. C. W. Hood,
BINNIE & PARTNERS,
Consulting Engineers,
Artillery House,
Artillery Row, London SW1P 1RX.

or telephone 01-222 7755 Ext. 307 for an application form.

UNIVERSITY COLLEGE HOSPITAL

Senior Computer Operator

for Chemical Pathology Dept. to work on the daily operations of an on-line Laboratory Computer System which is undergoing further development. This system is based on a Modular 1 Computer with disc backing store and multiple terminals. The job offers considerable responsibility and the successful applicant will be expected to be able to work to time schedules and to adopt a disciplined and professional approach to his/her work.

Applicants should preferably have experience of computer operating in a real-time environment.

Salary: £3,500 to £4,775 inc. London weighting. Shift allowance payable. Review pending.
Application forms and further information from Personnel Department, University College Hospital, Gower Street, London WC1E 6AU, Tel: 01-357 8900 Ex. 381, quoting Ref: GW/ECO/89.

CMG is a rapidly expanding Computer Service Bureau with operation subsidiaries throughout the UK and Europe.

We are seeking:

Senior Customer Account Supervisors

£7,500-£10,000

+ Profit share and other benefits to work in our Croydon office.

Sound business knowledge is essential as the work not only involves the supervision of production and the quality control of the business systems being processed on our computers, but also involves detailed liaison with our clients on the use and extension of computer systems within their organisations.

All applicants must have practical experience of computer systems and a sound understanding of accounting principles. These posts offer a wide variety of assignments and excellent career development. If you feel that you match up to our demanding yet highly rewarding standards, please write or telephone for an application form, quoting ref. S/1 to:

Trudy Allan,
CMG (Southern) Limited,
Surrey House, Bedford Park,
Croydon CR0 2AP.
Tel: 01-686 8351.



Fiji

Senior Systems Analyst/Programmer

Up to £9,230 plus allowances

Candidates must possess a relevant degree or equivalent qualification with three years systems experience, or if unqualified, have six years EDP experience in systems with a programming background in COBOL. Experience of ICL equipment, RPG II programming and on-line applications would be advantageous.

Duties will be to investigate potential computer applications, design and document systems, prepare programme specifications and supervise implementation. The officer will also be responsible for training and supervising programmers.

Salary includes a substantial tax-free allowance (reviewed annually) paid under Britain's overseas aid programme. Basic salary attracts 25% gratuity.

Benefits include free passages, generous paid leave, children's holiday visit passages and education allowances, subsidised housing, appointment grant and interest-free car loan.

The terms on which civil and public servants may be released if selected for appointment will be subject to agreement with their present employers.

For full details and application form write quoting MC/605/CD.

Crown Agents

The Crown Agents for Overseas Governments and Administrations, Recruitment Division,
4 Millbank, London SW1P 3JQ

1900 COBAL S. LONDON

SENIOR PROGRAMMERS
£5700-£6800

PROGRAMMERS
£4800-£6000

Development work in Project Teams

01-402 9355

SALES MANAGER

To head a small team selling magnetic storage media for computers. He/She will start as a "one man band" and will soon have one, and later two, sales representatives under his control.

We are currently selling these products at about £600,000 per year, and look forward confidently to a substantial increase.

The successful applicant will have experience as a salesman as well as controlling a field sales force.

Salary, commission, and a company car, will make a very attractive offer. This is a position of great importance to the company, and we are looking for a high calibre person to fill it.

Please reply to Peter Rose, General Manager.

BFI ELECTRONICS LIMITED

816 Wotton Road, West Molesey,
Surrey. Tel: 01-841 4088.

Computer Operator...

...who can handle responsibility

Marathon International Petroleum is a rapidly expanding oil and gas exploration and production company. Our activities in the North Sea, Europe, Africa and Asia are serviced from London where we need a Computer Operator (male or female) to work with our DataPoint/Ventek 6600 which is on-line to an IBM 370/168.

This position covers all aspects of computing in a small department which works on a two shift system - 9.00am-5.00pm and 1.00pm-4.00pm - alternating weekly. You must be capable of accepting the responsibility for running the evening shift on your own. Opportunities exist for training in programming techniques at a later stage.

You should have relevant experience on similar equipment and be aged in your 20's.

An excellent salary will be offered with benefits which include four weeks holiday, luncheon allowance, season ticket loan scheme and a non-contributory pension and life assurance scheme.

Please telephone for further information and an application form or write with full career details to:

Howard Statham or Paul Wood,
Marathon International Petroleum (GB) Ltd./
Pan Ocean Oil Corporation,
35/38 Portman Square, London W1H 0BN.
Tel: 01-486 7211.



DORSET COUNTY COUNCIL

DORSET INSTITUTE OF HIGHER EDUCATION
(Wellsdown, Poole)

Computer Manager

GRADE SO1 £5,232 to £5,568
(Inclusive of supplement)

The Computer Centre in the Wellsdown Campus of the Institute takes for education courses throughout the County of Dorset, as well as for courses run by the Institute.

You will be a member of the Institute staff responsible to the Director for the day-to-day management and operation of the Centre and will be involved in the development of the Centre. Technical staff in present consists of two operators, and one punch operator.

A detailed knowledge of computer technology and programming using such languages as BASIC and FORTRAN (particularly in an education context) are essential, and you must have an ability to operate an I.C.L. 2903. Experience in managing and operating a small computer unit would be an advantage.

Removal and luggage expenses in approved cases.

Application forms, returnable by July 15, 1979, and further details from Chief Administrative Officer, Dorset Institute of Higher Education, Wellsdown Road, Wellsdown, Poole BH12 59G.

(Please quote: EO HEB 71).

London Borough of Waltham Forest

WALTHAM FOREST COLLEGE

Department of Sciences

Lecturer I in Computing Science

The post will involve teaching various aspects of Computing Science to a wide range of existing courses and the setting up of new courses. Candidates should preferably have had experience in some aspects of Computer Technology although people who have a grasp of Mathematics coupled with a willingness and interest to enter the field of Computing will be considered.

Salary Lecturer Grade 1, £3,192 to £5,334 plus London Allowance £327 (salary review pending). Post tentatively from 1st September, 1979.

Application forms and further details available from the Principal (Staffing), Waltham Forest College, Forest Road, Waltham Forest, London E17 4JG. Tel. No: 01-527 2311, Ext. 259.
Closing date: 2 weeks from appearance of advertisement.

PROGRAMMER

We have a major development programme which involves

- the implementation of a large branch terminal network using IBM 3600 equipment.
- the implementation of a database system.
- the extension of local TP using 3270's

We need to enhance our existing team to ensure the success of this demanding programming and are thus able to offer a Programmer an exciting opportunity to extend his/her experience.

Applicants should have a minimum of two years' experience using PL/1 or Assembler. Preference will be given to applicants with experience using DL/1 database system or 3600 financial terminal equipment.

This appointment will be based in our Head Office in Bristol. A realistic salary, which is reviewed annually, will be offered, and there are attractive fringe benefits, which include a contributory Pension and Life Assurance scheme, assisted membership of BUPA/WPA and staff house purchase facilities.

Please write in the first instance with brief details of your age, qualifications and previous experience to: The Personnel Manager, Bristol & West Building Society, P.O. Box 27, Broad Quay, Bristol BS99 7AX.

Bristol & West BUILDING SOCIETY
A MEMBER OF THE BUILDING SOCIETIES ASSOCIATION

LI/II IN COMPUTER STUDIES

Applications are invited for a lectureship in Computing in the School of Economics and Accounting. The School runs a BA Economics course, a full-time Accountancy Foundation course and a range of part-time professional courses.

Applicants should be graduates, preferably with relevant industrial or academic experience, and should also be eager and willing to liaise with lecturers in other disciplines to form cohesive, vocationally oriented courses.

Salary: LI £3865 to £5860 pa; LI/II £4575 to £7032 pa. (both figures inclusive of London weighting).

Application forms and further details from The Chief Administrative Officer (TD/uc), Ealing College of Higher Education, St Mary's Road, London W8 5RF.
Closing date: 14 days from appearance of advertisement.



West-Coast USA T.P.+Database

A Multi-national corporation based in Southern California operating IBM 370/158's, 3031 and 3033's have retained Logistix to identify Database designers + Analysts and T.P. applications programmers especially with experience of either IMS or CICS. Programmers will be particularly qualified in the use of ANS COBOL and will either be conversant with or willing to learn structured programming techniques.

Initial Contracts will be for a 1-2 year term and will be offered to suitable applicants able to substantiate Data-base and/or T.P. skills at a technically demanding level.

In addition to highly competitive salaries our client will be providing a attractive fringe benefits to cover return air fares to the U.S., paid initial accommodation, medical + dental insurance, productivity bonus etc. Our clients will be in London at the beginning of July and offers will be made within 14 days. Salaries will be in the region of:

\$30K

Comparable opportunities coast-to-coast



Phone: 01-491 4636

Avon House, 360 Oxford St., London. W1N 9HA.

201 East 42nd St New York N.Y. 10017 USA

PROGRAMMING TEAM LEADER

CENTRAL LONDON c. £7500

This is an opportunity to manage a small team of programmers within the programming department of a major ICL 2900 installation. Most of the work is related to new applications, including on-line, real-time and database systems.

You would be involved in:

- development of overall program design
- quality control and scheduling/monitoring of the team's work
- guidance, training and motivation of programmers
- participation in the development of code, systems testing and technical problem solving

The opening will interest a senior programmer with:

- at least four years' programming experience, including sound COBOL (on any hardware)
- experience in controlling a small team, or demonstrable leadership potential
- (ideally) knowledge of one or more of the following — VME/B, large applications, real-time, database management systems

Career prospects are good (with a salary increase within six months) in an installation with a lot of development work on hand, and appropriate further training on modern techniques will be provided as required.

We have been retained by clients to recruit for this post. Please ring us in confidence, quoting ref. 841, or leave a message on our answering machine and we'll contact you.

EDP SYSTEMS LTD
52-53 Margaret Street, London W1N 7FF
Telephone 01.637 5796 (24 hours)

DATA PROCESSING SUPERVISOR

WEST BYFLEET, SURREY

Required for a technical consultancy mini computer.

Experience: Previous experience on IBM 1130 systems operations or equivalent a necessity. Knowledge of Fortran IV essential, Assembler and Cobol an advantage.

The Job: Supervision of and responsibility for all aspects of computer operations. Hands-on operation of computer system and peripherals.

Running jobs and checking output. Programming and liaison with user staff for either full programming or de-bugging of technical programs.

The System: Digital Scientific Mole 4, 32K main core, 16K auxiliary core. Operates under IBM 1130 emulation mode. Card reader 000 cpm, Line Printer 300 lpm. Multidisc (2) 40 megabytes, single disc, 1 megabyte. Plotters, digitiser and tape unit, terminals.

The position requires dedication and drive with the ability to anticipate initiative and anticipate job needs, to anticipate and mix with all staff levels.

Salary £8 000 per annum negotiable. Fringe benefits.

Applications in writing to

Miss C. J. Horton
Gaffney, Cline & Associates Limited
GCA International Building
Rosemount Avenue, West Byfleet, Surrey

EDUCATION DEPARTMENT
MONKWEARMOUTH COLLEGE OF FURTHER EDUCATION
Department of Science and Technology

LECTURER I (E3192-E5334)

LECTURER II (E4101-E5555)

IN COMPUTING AND DATA PROCESSING

Applicants should have appropriate qualifications and experience. A professional qualification in Computing or Data Processing would be an advantage. In the case of the Lecturer Grade II, applicants should have commercial experience in programming or systems analysis. Commencing salary dependent upon qualifications and experience. Application forms and further particulars available upon receipt of a stamped, addressed envelope, from the Principal, Monkwearmouth College of Further Education, Swan Street, Sunderland SR8 1EB. Closing date for applications: 4th July, 1979.

Borough of Sunderland
L.A. BLOOM
CHIEF EXECUTIVE

IBM COBOL

PROGRAMMERS

CENTRAL LONDON

PROGRAMMERS

TO £6,500

SENIOR PROGRAMMERS

TO £7,500

For Development Work
in Project Teams

01-402 9355

COMPUTER ENGINEERS

U.K. all systems go O.S.

FIELD/SITE/SUPPORT/MANAGEMENT
ALL SYSTEMS GO
£3,000-£17,000
STAND BY
SHIFT
OVERTIME
(according to post)
CAR OR ALLOWANCE
C. D. Stack Associates
RECRUITMENT CONSULTANTS: HODDERSON (08424) 42729

FURNESS WITHY SHIPPING

We are an international shipping organisation, part of the Furness Withy Group of Companies. Our recently-formed computer department, currently operating on I.C.L. 2904 in London and remote 7502s, is embarking on a number of new, major projects which will form an important and integral part of the Group's business operations. We are building a carefully selected team of experienced professional computer staff to define and subsequently develop the variety of systems required by a Group of this standing and there is now an opportunity for three experienced staff to join our team.

SYSTEMS ANALYST

CIRCA £7,000 PER ANNUM

LOCATION—LIVERPOOL
(PACIFIC STEAMSHIP NAVIGATION COMPANY)

You will have a demonstrable record of achievement which will include project responsibility for the design and successful implementation of a major new system. Whilst previous experience in the shipping industry would be advantageous, it is not essential. Applicants must, however, be capable of working effectively with all levels of user management and staff and should have a programming background. The successful applicant will work in Liverpool as project controller of a mini-computer-based freight documentation system.

SENIOR PROGRAMMERS

CIRCA £6,500 PER ANNUM

LOCATION—CITY OF LONDON

You will have at least three years' programming experience in Cobol and R.P.G. and will have been involved in the design and implementation of at least one major system. Experience in a communications environment would be a distinct advantage. As part of a small team you will have a leading role in the design, writing and implementation of programs.

For the right people career prospects are excellent and they will be encouraged to contribute to the data processing plans of the organisation.

Fringe benefits include B.U.P.A., subsidised staff restaurant, interest-free season-ticket loans and contributory pension scheme.

For further information contact the Computer Manager on 01-481 2020 (ext. 2814) or write, in complete confidence, giving relevant details of age qualifications and experience to: Mr. F. W. Wainwright, Personnel Manager, Shew, Sevell & Albion Limited, 52 Leadenhall Street, London EC3A 2BJ.

International Statistical Institute World Fertility Survey

SYSTEMS PROGRAMMER

The organisation: WFS provides back up and support to a worldwide programme of population research. It is based in London but financed by international agencies. The professional staff of over 50 people include demographers, statisticians and data processing experts from 14 different countries.

The hardware: An HP3000 (II) with 1/2 mb of store and 350 mb of disc. All work is done through on-site terminals.

The job: This is a new post to support the work of an existing systems programmer. Most of the load on the computer is related to data analysis and data archiving and the systems programmers ensure that the basic software is maintained and developed as appropriate and provide technical advice to the general users. Technical assistance to a developing country may possibly be assigned as well, requiring occasional overseas travel.

The qualifications: The ideal candidate would be a graduate with a general computer systems background of several years (preferably with HP3000 experience) and some acquaintance with statistical data processing. A second language (French or Arabic) would be highly desirable.

The rewards: WFS occupies pleasant offices in a useful corner of London.

We offer the successful candidate a challenging opportunity in an international environment with a salary of not less than £9,000 per annum.

Send curriculum vitae to:
Deputy Director for Data Processing
International Statistical Institute
35-37 Grosvenor Gardens
LONDON SW1W 0BS.



We're successful because our staff are

Data Logic operates at the forefront of computing, applying the very latest hardware and techniques to practical commercial problems. We cover the range from mainframes to the smallest computers. We are leaders in the use of microprocessors for applications that not so long ago required far larger machines.

Many of the systems we supply go far beyond providing extra speed and cost savings. They will revolutionise the way the user organisations operate. Several projects involve dispersed networks of ten or more minicomputers. Our largest turnkey system incorporates twenty-three machines and close to three hundred display terminals across the country — a totally new system which will serve almost every function within a leading company. A new police contract involves the first use in the UK of a mini for a complex data retrieval

application — with our own advanced methods for rapid, generalised record searches.

The exceptional scope and quality of work is important to our staff. We can match their individual experience to their projects. Equally, we can ensure that each project adds to their experience. As computing itself develops, so do they.

Over the past year Data Logic has grown dramatically in size, in scope of work and in reputation. Our expansion has meant unrivalled opportunities for career progression. We are not prepared to promote people before they are ready for it. But when they are ready — and we give all the assistance we can — the positions as senior programmer, senior analyst, project manager and consultant will be there waiting for them.

The reason is simple. We know that we are successful only if our staff are.

Senior Software Staff

(Ref PS/32/CW) For maintenance, minicomputer and mixed processor systems, usually supporting terminal networks. Increasingly Data Logic's turnkey projects involve minicomputers at multiple sites.

Applicants must have at least five years experience including some work in consultancy, system design or team management. Substantial knowledge is required of either high level language implementation on a leading mainframe or assembler language development on DEC, Data General or other leading minicomputers. We are especially interested in experience of:

- database systems
- distributed systems
- data communications
- telemetry
- operating systems design and implementation.

Salaries will be highly competitive and a company car is provided to staff at senior team leader level or above.

There are vacancies at our Greenford, Birmingham and Manchester offices.

Programmers

(Ref PS/33/CW) For both mainframe and minicomputer projects which include commercial applications, monitoring and control, and scientific analysis.

Applicants should have at least 18 months programming and/or analysis experience in high-level language or assembler on any leading mainframe or minicomputer.

This is an outstanding opportunity to gain experience in the development of complex high performance software. Our programmers work in small teams, taking considerable responsibility for distinct areas of the total system.

Salaries will be highly competitive. Vacancies exist at our Greenford, Birmingham and Manchester offices.

Our profit sharing scheme ensures that staff benefit from the company success they create. Regular career appraisals provide a direct link between individual achievement and personal rewards.

Write or call, quoting the appropriate reference number:

Kathy Martin
Data Logic Limited
29 Marylebone Road
London NW1
01-486 7288

Data Logic

(A Northgate Company)

Appl. No. 1/79

MYRIAD

IBM OPERATORS

W. LONDON/MIDDX BORDER Circa £5100

Our client's computer installation is expanding rapidly with the acquisition of new hardware. Extensive systems development being carried out has created a number of very interesting operations positions for persons able to offer two years', or more, experience of operating IBM 370 hardware in a DOS/VS environment.

The present configuration comprises a 370/138 running under DOS/VS POWER/VS and four major real-time systems are currently being developed to run on a newly created network of DEC PDP11 computers. The persons appointed, therefore, will be keen to progress their careers and will demonstrate an ability to learn and adapt swiftly to new techniques in a busy environment.

A three shift system covering five days a week is in operation. The company offer valuable bonus schemes and a good base salary comprising a package which may be in excess of £5100 and, as one of Europe's major motor manufacturers, they also offer an exclusive discount car purchase scheme.

Ref. SW2/2106

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
01-353 0981 (24 HOURS)

Systems Support Leader

With a substantial programming background

c. £7000

Reading

Rapid growth of Europe's leading software house - doubling in size every three years - means we are now looking for another good Support Leader. You will head a team dedicated to the development, maintenance and support of our user service, here at the Datskill Systems Centre.

Specifically you will be supporting our George operating systems and DME using 2904, 2960 and 1904S machines. You will be the Centre's technical expert in this field, with about half our operating systems under your control.

As well, naturally, as your responsibility for timescales and budgets, we shall expect you to keep the service developing and expanding. Your heavy involvement with both internal and external customers will call for considerable skill in providing technical advice

and assistance. You will provide leadership for a small team in which you will need to foster and maintain a high degree of expertise.

We are looking for someone with a solid background in GEORGE 3 including both operations and programming experience.

Career prospects are excellent. This appointment, for example, could lead to that of Systems Support Manager or senior programming or contract work anywhere in our organisation.

The salary will be in the region of £7000, and you would be eligible for our 1979 Productivity Bonus Scheme. We will also help with relocation expenses to the Reading area where appropriate.

Please contact Mick Smith, Manager, Datskill Systems Centre, ICL Datskill, 128-130 Cardiff Road, Reading, quoting reference CW1413. Tel. Reading (0734) 582041, at any time.

ICL Datskill
The Computer Professionals

Cable and Wireless UK Services Ltd, a company within the worldwide Cable and Wireless Group, design and install a wide range of telecommunications and data processing systems. We are currently running commercial Data General mini-computer systems to both large and small organisations with all types of applications, and due to phased expansion now require the following staff:-

Field Systems Consultants

Salary range £6,500-£9,000 + Car

London - Leeds - Birmingham

A number of positions exist for expert Consultants to provide support for the Sales Executives. These demanding positions offer unlimited scope for career progression and would suit computer professionals with experience in mini-computers and ideally with a communications and/or accounting systems background.

Programmers

Salary range £4,500-£6,000

London

If you are an ambitious Programmer with experience of mini-computers, COBOL or related high level languages, here is your opportunity to grow with a fast moving team providing a valuable back-up to our Consultants. Career progression is up to you - there is plenty of opportunity.

Sales Executives

Earnings up to £15,000 + Car

London - N. England

For enthusiastic and self motivated Sales Executives earnings of around £15,000 p.a. are realistic. Previous hardware sales experience is a must, and we will provide all the support and product training you will need. If you have the drive and initiative to sell to a variety of markets, we will give you the opportunity to take your career right to the top.

Production Control Specialist

London based

Our expansion has taken us into the fast moving field of interactive computerised manufacturing systems. If you have the engineering know-how and the ability to solve production problems in an industrial environment, combined with a knowledge of computer based systems, this newly created position is the challenge your career has been waiting for. Extensive UK travel is involved.

The rewards we are able to offer are excellent and well matched by the job satisfaction involved in developing our computer activities as part of a planned expansion programme. Promotion prospects are excellent and company benefits include regular salary reviews with cost of living allowances, season ticket loans and an excellent pension scheme.

For further details and an interview please contact: Sue Mathews, Cable and Wireless UK Services Ltd, 83 Blackfriars Road, London SE1 8HQ. Tel: 01-633 9577.



CABLE & WIRELESS UK SERVICES LIMITED

As the leading computer recruitment consultancy in Essex, we have many interesting and challenging positions on our books in both Essex and London. Here are just a few:-

CITY

SYSTEMS ANALYSTS

to £8,500

PROGRAMMERS

to £7,000

SYSTEMS PROGRAMMERS

to £7,100

Our client, a multinational company, have a large IBM installation and are looking for persons with sound experience in the above listed disciplines. For all these vacancies IBM mainframe experience is required. Systems Programmers must have a sound Assembler background. Application Programmers must be conversant in PL1 and/or Assembler. Systems Analysts must be experienced in commercial applications. Basically you must be good. Are you?

For more information about any of these permanent positions, plus many of the other interesting opportunities we can offer you, phone Martin Walton on:

BRENTWOOD (0277) 212021

LINSCOTT
Computer Systems Limited

or write to him at LINSCOTT COMPUTER SYSTEMS LIMITED, P.O. Box 74, BRENTWOOD, ESSEX CM15 0B7.

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ESSEX

PROJECT LEADER

to £6,000

ANALYST PROGRAMMER

to £6,000

SYSTEMS PROGRAMMER

to £6,800

Our client, a large publishing organisation, with an IBM installation operating under DOS/VS and CICS, are looking for persons experienced in the above listed disciplines. The Project Leader and Analyst Programmer will have at least 3 years programming experience and although not essential, a knowledge of PL1 would be an advantage. The Systems Programmer will have a sound knowledge of Assembler. This company offers the right people an interesting and secure future. Are you the right person?

Publicity Author

Industrial Computer Systems £4075 to £6442 and Bonus

We are seeking an experienced and energetic technical writer whose primary task will be to write and produce a continuous output of high quality technical brochures and leaflets. All aspects of literature production are involved, from initial planning and collection of technical information to preparation of copy and the supervision of photography, design and printing. There will also be opportunities to participate in related publicity activities such as exhibitions, advertising and public relations work.

Applicants, male or female, should be able to produce evidence of successful commercial writing, preferably in the fields of electronics, computing or control systems. They should also have sufficient technical background to be able to collect information by discussions with senior designers, assess its relevance and recognise points requiring deeper investigation.

This is a progressive opportunity in an expanding Division of the Company which is located in an attractive part of South Manchester within easy reach of open countryside and good residential areas.

Apply to Mr. W. L. Robinson, Ferranti Computer Systems Limited, Simonsway, Wythenshawe, Manchester M22 5LA, quoting reference 79WD/6/CW.

FERRANTI
Computer Systems

CLASSIFIED COPY

All classified copy should reach our offices no later than 5.30 p.m. on the Monday preceding Thursday's publication. If complete artwork is supplied 12 noon on a Tuesday.

Ring David Abbott for further details on 01-261 8015

R.P.G. II

EUROLOGIC are leaders in installing small business systems particularly for small users. We specialise on IBM S/32, S/34 and S/38 using RPGII and are willing to train you onto these machines so long as you have a minimum of:

- ★ 2 years' programming on small machines
- ★ an aptitude for learning
- ★ exposure to commercial systems

Of course, if you already know RPGII or have a knowledge of system design and the ability to deal with users, then we would particularly like to hear from you.

For the right people we offer:

- ★ Salaries from £4,500 to £8,000
- ★ Company car after a period
- ★ Bonus scheme
- ★ Expenses
- ★ Reviews every 6 months
- ★ Wide variety of customers and

We have vacancies at the levels of

- Project leader
- Analyst programmer
- Programmer

Please call RICHARD BARKER or MIKE CANNON on (01) 549 8937 or 8933 to arrange an interview

Eurologic Software Ltd.
12 Canbury Passage, Richmond Road
Kingston upon Thames, Surrey


CLASSIFIED COLUMN WIDTHS

Artwork, PMT's and Film etc. are still being supplied oversize, as this places considerable extra work on our printers process department as well as changing page layouts. Advertising agents are reminded our column widths are as follows:

- SINGLE COLUMN 39mm (9 1/2 cms)
- DOUBLE COLUMN 82mm (18 1/2 cms)
- TRIPLE COLUMN 126mm (30 cms)
- FOUR COLUMNS 168mm (40 cms)
- FIVE COLUMNS 211mm (50 1/2 cms)
- SIX COLUMNS 254mm (61 cms)
- SEVEN COLUMNS 296mm (71 cms)

For further details contact David Abbott 01-261 8015

01-261 8015



ARE YOU A PDP ACE?

If you are, our client, a leader in the fields of software design, analysis, and implementation, would like to cut you in on one of the best deals in the industry. Due to a firm commitment for expansion in their London and Reading offices, they are presently recruiting in two technical areas:

SYSTEMS ANALYSTS

Two + years of commercial applications design and implementation in Accounting/Financial/Insurance or in Sales Order Processing/Stock Control/Production areas. Technical background preferred. Compensation to £7K.

QUOTE REFERENCE ACE 3754/1

Our client offers an excellent career path, from Programmer through project management end into sales, if desired. Extensive training for other machines, operating systems, and languages is readily available.

PROGRAMMERS



One + year of commercial programming experience, utilizing BASIC+ on the PDP 11, operating under RSTS-E. Other languages and operating systems will be considered, with the key being a desire and ability to learn. Compensation is £4K+.

QUOTE REFERENCE ACE 3754/2

INTERESTED?

Please contact Alan Whitford at Accord Computer Efficiency Ltd
Portland House
4 Great Portland Street
London
W1N 5AA

Tel: 01-637-5001, 01-580-3754
Telex: 261334 ACE UK
Licence No: SE(A) 3320



Our Team has a Reputation Second to None — Here is your Opportunity to Join in their Success

CAPP ASSOCIATES has been successful in D.P. recruitment for a considerable time and a company must have something special to stay at the top of this industry. In our case it is a reputation for honest and effective dealing with client companies and people alike, resulting in an increasing demand for our services.

We need to expand our RECRUITMENT CONSULTANCY team by appointing the following:

Marketing Consultant — located in CROYDON to specialise in sales appointments throughout the U.K., with emphasis on computers and allied products but embracing the whole sales spectrum. The position will hold responsibility for establishing this important aspect of recruitment.

Recruitment Consultant / Manager Designate — to take responsibility for permanent appointments in the North and Midlands based in centre MANCHESTER. Previous computer recruitment experience and an established successful record in the business is essential. Success could lead to a senior appointment and equity participation in the company.

Contracts Consultant — for freelance staff, based in CROYDON, responsible for consolidating the contract function in and around LONDON.

Technical Consultant — in CROYDON to specialise in all types of personnel for MICRO/MINI COMPUTER systems engineering positions throughout the U.K.

Our Consultants enjoy varied, interesting, well-paid jobs having the freedom to work in their own way with a high level of support—their objective is to recruit people for client companies in a positive and reputable manner. Individual remuneration is geared to the person's success with average earnings at a high level, and company cars provided at more senior levels.

Our Directors want to discuss these opportunities with you, informally but in complete confidence, if you have relevant recruitment and/or sales experience, together with the energy and purpose that they demand. Please telephone initially.

Ref: CW153-9B



CAPP ASSOCIATES
LONDON AND MANCHESTER



01-686 9693
A.M.P. HOUSE, DINGWALL RD.
CROYDON, CR9 2AU

Computer Operators & Trainee Computer Operators

That Central Electricity Generating Board has a number of vacancies for Computer Operators and Trainee Computer Operators at its Headquarters Computing Centre located at 85 Park Street, London EC1A 3DF.

The computing centre operates a variety of:

- 1. 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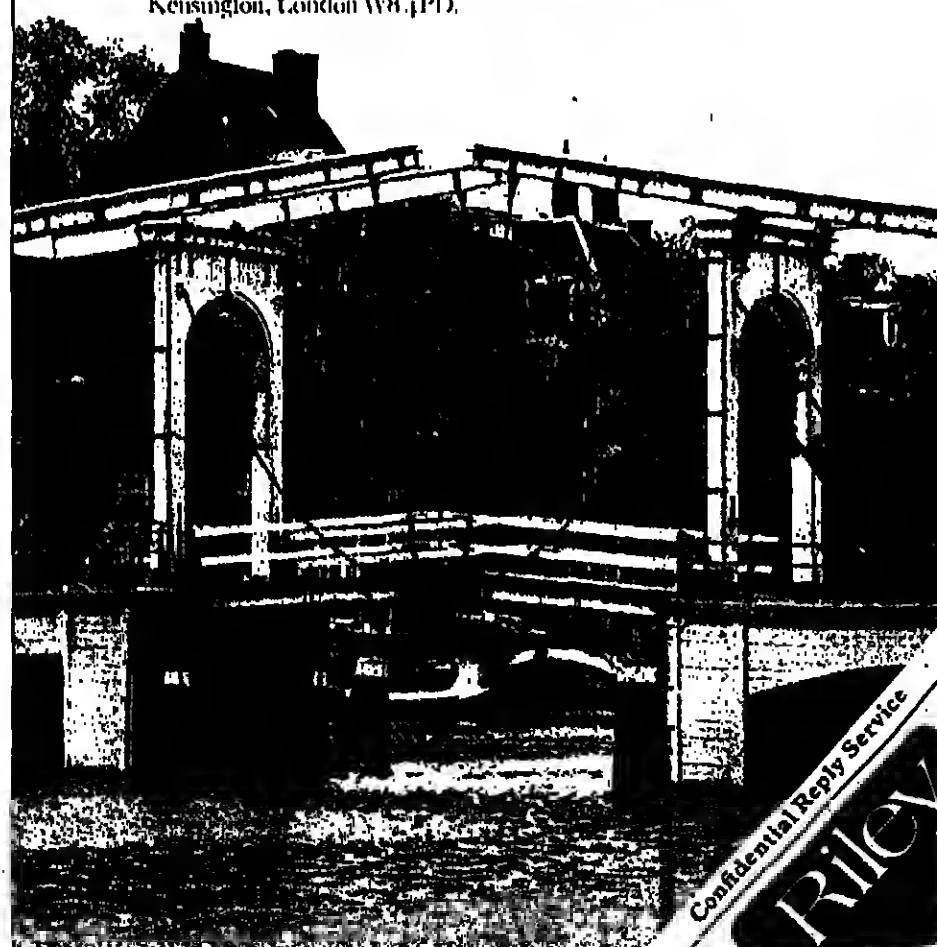
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In the first instance contact Dave Scarlett on 01-935 0671 or (evenings and weekends) on 01-540 3549.

CITY OF SHEFFIELD

City Treasury Computer Services Division SYSTEMS ANALYSTS AND PROGRAMMERS

The City Council has decided to replace its ICL 1904S (192K) computer by an ICL 2960 (2Mb) in November 1979 followed by an ICL 2972 (4Mb) in January 1981. During this period both D.M.E. and V.M.E./B. will be in use and it is proposed to increase existing communications facilities, including on-line development and to expand database facilities rapidly. Applications are invited for the undermentioned posts to assist in this transition programme. ICL 2900 experience, although desirable, is not essential as a comprehensive training scheme will be introduced.

SENIOR SYSTEMS ANALYST

PL1 - £6080-£6702 (including supplement)

Should preferably have at least four years' experience in the design of computer systems and be capable of accepting a high degree of responsibility for the successful completion of major projects.

SYSTEMS ANALYSTS

AP5/801 - £4773-£5568 (including supplement)

To work under the general control of a Senior Systems Analyst on the development of new systems and the conversion of existing systems. Preference will be given to applicants with at least two years' experience in the design and implementation of computer based systems.

SENIOR PROGRAMMERS

SO1/2 - £5232-£6060 (including supplement)

Several years' programming experience in Cobol are required. Must be capable of supervising other programmers within a project team. A good working knowledge of George 3 will be an advantage.

PROGRAMMERS

T4/5 - £4248-£5079 (including supplement) Must have at least one year's experience in Cobol programming, preferably in a George 3 environment. Candidates must be able to demonstrate the ability to produce soundly constructed working programs to predetermined schedules.

Applicants should send full details of qualifications, experience and references, along with names and addresses of two referees to the Chief Personnel Officer, Personnel Department, City of Sheffield, Sheffield S1 3LN by 4th July.

CCC Contracts Personnel

16, Bedford Row, London WC1R 4EB.

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IBM Internals £ Neg
Systems Programmers

Intel 8086/88 £ Neg
Software Design & Programming

C. Germany

PDP 11 RSX 11 £350
Analyst Programmers—Commercial

PL1 - 6 mths. + Experience £250+
Programming

TC 800 £350
Analyst Programmers—Commercial

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PDP 11 RSX - BASIC + prof. £320
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Analysts and Programmers are also required for various commercial assignments in the U.K.

For further details, please contact Roger Allington, quoting ref. PL1/CV. If more convenient please call Birmingham (04427) 2289.

Evening/Weekend 01-242 9356